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The Journal of the Department of Agriculture of Victoria, Australia

January, 1922.

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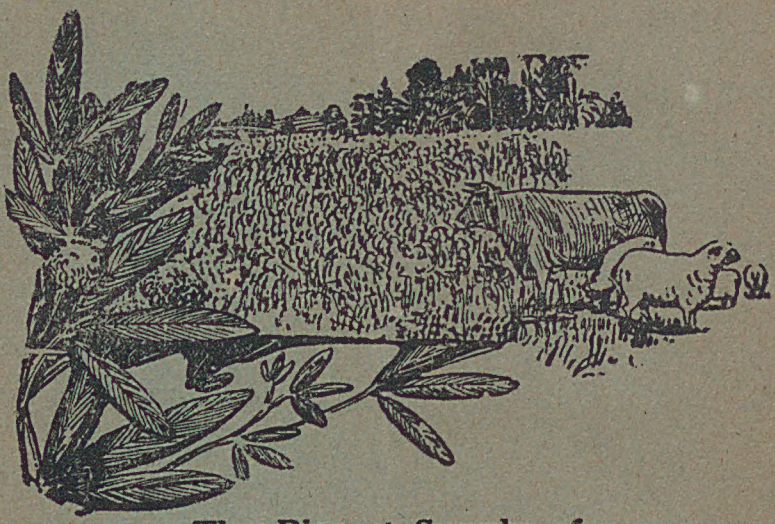

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THE JOURNAL

OF THE

DEPARTMENT OF AGRICULTURE

OF

VICTORIA,

AUSTRALIA.

PUBLISHED FOR AND ON BEHALF OF THE GOVERNMENT BY DIRECTION

OF THE

HON. H. S. W. LAWSON, M.L.A.,

Minister for Agriculture.

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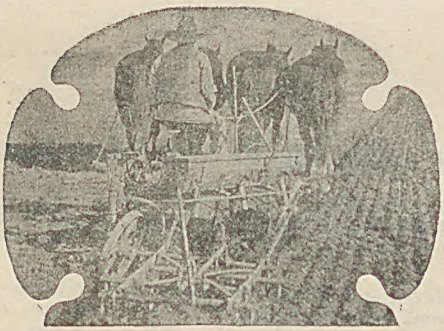

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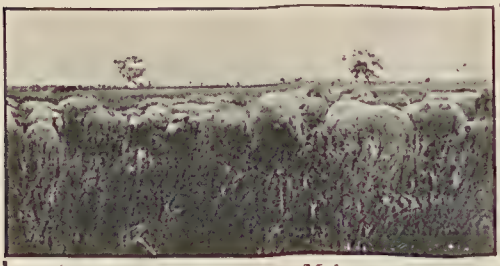

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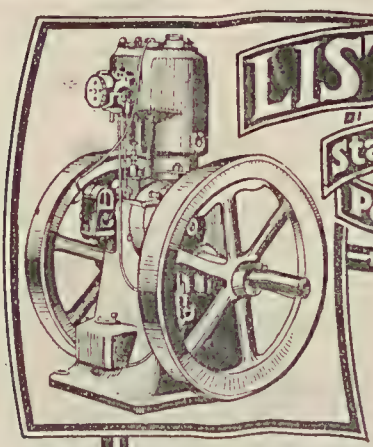

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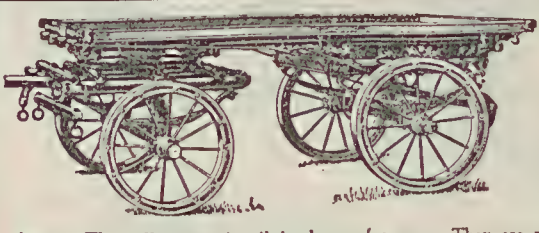

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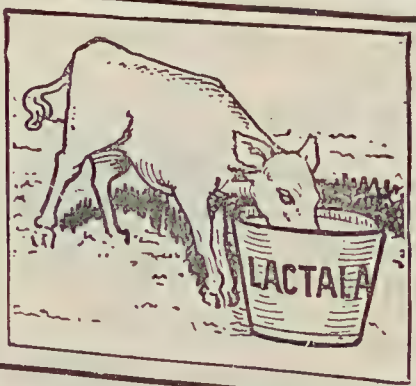

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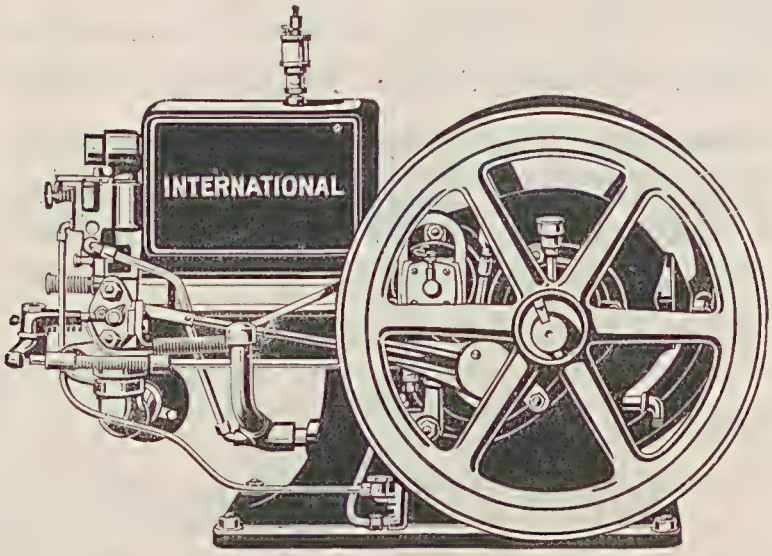

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THE JOURNAL

OF THE

Department of Agriculture

OF

VICTORIA.

Vol. XX. **January, 1922.** **Part 1.**

ONION PRODUCTION IN VICTORIA.

S. G. Harris, Senior Potato Inspector.

The first acre of onions grown in Victoria was planted at Bellarine, in 1854, by Mr. Fred Willey, and since then the industry has made very material progress, and at present about five-sixths of the total onion production of the Commonwealth comes from this State.

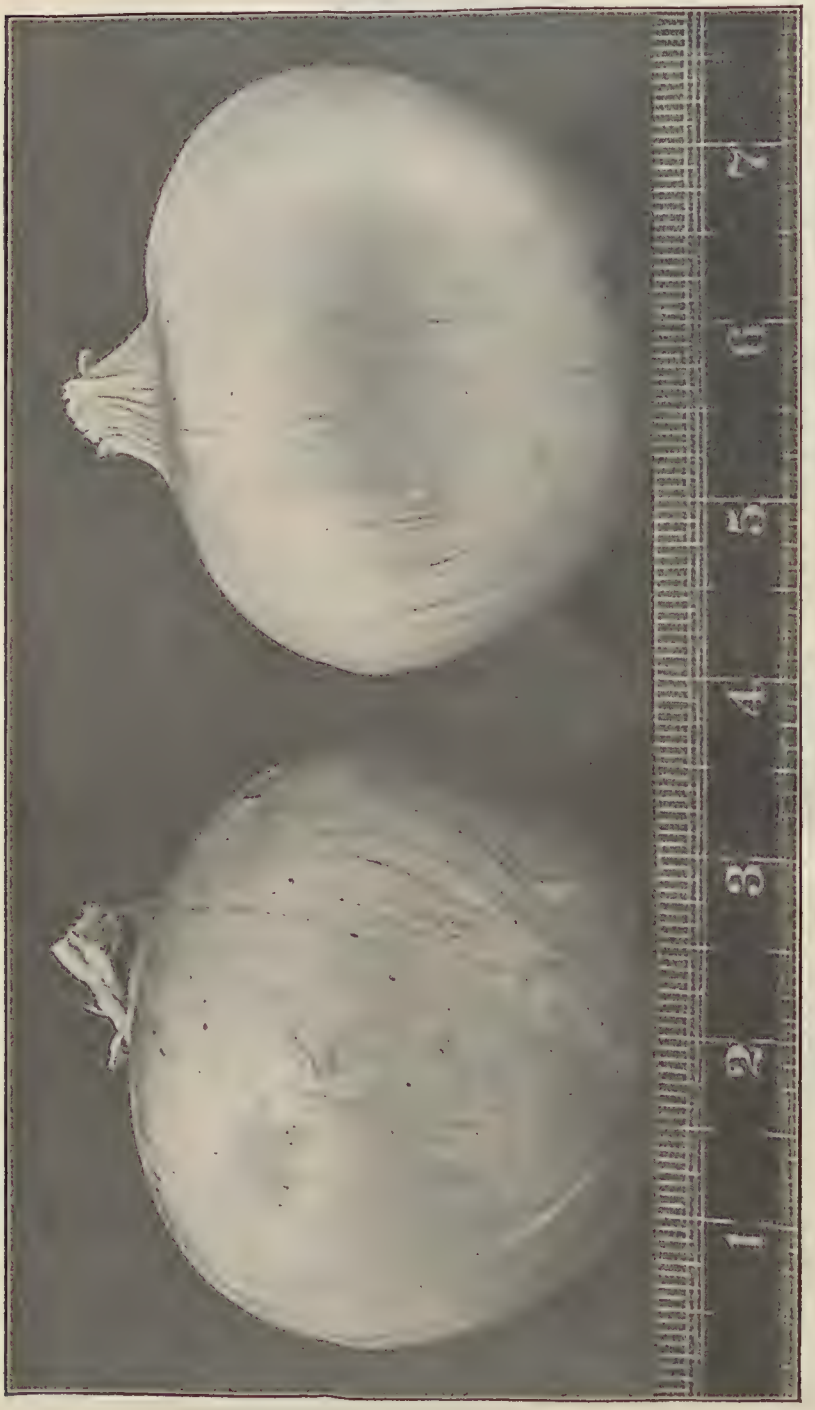
The lowest area sown in Victoria during the past twenty-two years was 2,815 acres in 1900-1901, and the highest, 9,294 acres, in 1915-1916, producing 12,766 tons and 37,587 tons respectively. This year (1920-1921) there was under cultivation 8,000 acres, which yielded 42,985 tons.

The onion is a very hardy plant, and can be grown in almost any soil and climate in garden plots for household use; but for commercial purposes the production in this State is confined to the counties south of the Dividing Range, the principal districts being Colac, comprising Nalangil, Corunnun, Cororooke, Ondit, Warrion, Alvie, Beeac, Barpamba, Weering, &c.; Warrnambool, which includes Illowa, Koroit, Crossley, and thence to Port Fairy; South Gippsland, from Poowong and Loch to Meeniyan; and the Brighton district.

Varieties.

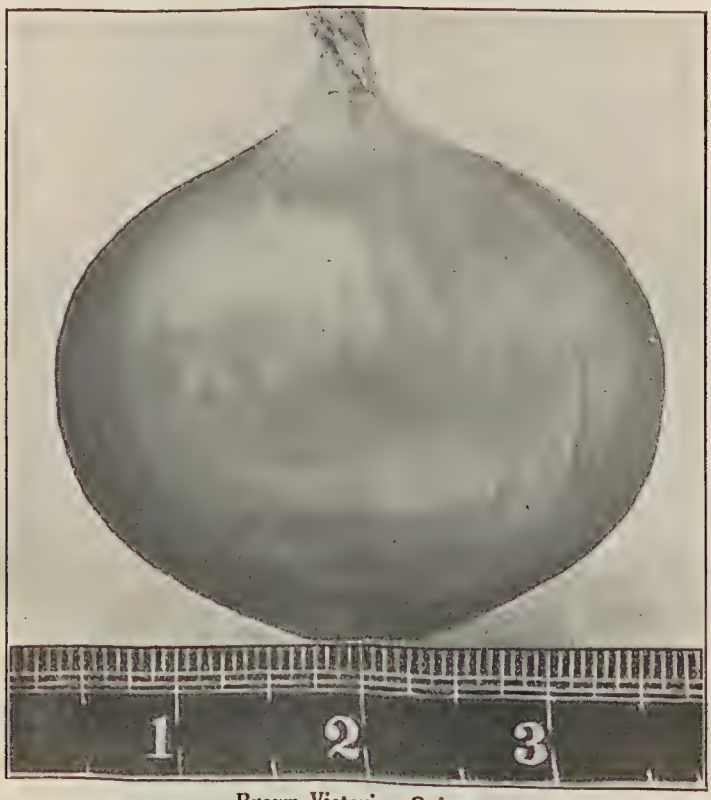
The soil of the Brighton district, varying from light sand to sandy loam, is given up to production of the Early Globe and Silver Skin varieties, with few of the Golden Globe mixed through the Early Globe crops.

These are all early varieties, and come into the market in October, when the late varieties are becoming scarce and growthy, and supply traders' and exporters' requirements from then on till about February. None of these early varieties are good keepers, and must be marketed


Golden Globe.
Globe.

soon after skimming. They cannot be stored for lengthy periods as can the Brown Victorian bulb.

A word of explanation relative to the last-mentioned variety is, perhaps, necessary here. It is commonly known as the Brown Spanish, but this is a misnomer, as the so-called Brown Spanish and the true bulb of that name are unlike in every particular. The Victorian is much darker in colour, is well set up with a good "shoulder," has from three to five outer skins, and is very firm in texture. The Brown Spanish is light in colour, flat on top, has a tissue-paper-like skin, and is much softer in texture.

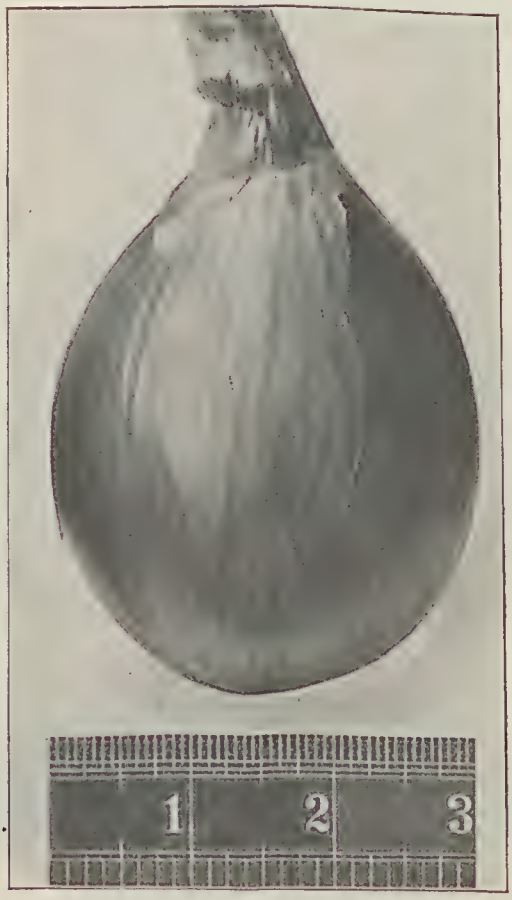


Brown Victorian Onion.

The honour of raising the Brown Victorian onion cannot, with certainty, be assigned to any one individual. Its origin was very largely the result of the skill and enterprise of our early growers, among whom may confidently be mentioned the late Mr. Levein, Mr. Henry Hibbert, and Mr. Robt. Willey, who, by cross fertilization of different varieties, produced an onion that is second to none in the world in quality and in keeping and carrying capacity. Growers in the Colac, Warrnambool, Gippsland, and other late districts practically confine their sowings to two varieties—the Brown Victorian and a Globe variety.

The Late Globe, here shown as Burns' Corunnun, is a cross between the Early Globe and the Brown Victorian, and was produced by Mr.

Andrew Burns, of Corunnun. It took about five years of careful selection and hybridization to bring the bulb up to its present state of perfection. Mr. Burns has now been growing it for ten years, and it is still proving true to type. The Late Globe should be planted only in late districts for an intermediate crop, to be ready for harvesting from about the middle of January onward. Like the Early Globe, it is not a good keeper, and should be marketed not later than May.



Burns' Corunnun (Globe Variety).

As a general rule, they will be ready to harvest fully three weeks earlier than the Brown Victorian, and, on an average, will yield fully two tons to the acre more, but if stored for any lengthy period this advantage will be more than lost through the excess of growthy bulbs which will have to be discarded when they are being prepared for the market, added to which will be the cost of regrading.

For the main crop which may be held (in part or the whole) until August or September, or even November, when prices are usually

highest, growers should be careful to plant only the best Brown Victorian variety.

Seed.

The first essential to successful production is high-grade seed that is true to type. To obtain such seed growers will be well advised to select their own bulbs, and plant their own seed plots. It may be necessary to go through several tons of good marketable onions to get a few hundredweights of bulbs fit for the seed plot. They should all be put over the screen, and only bulbs of typical shape, with good skin, fine neck, and full shoulder selected. This will take time, but it will be time well spent, and will give results that will pay handsomely. A grower who sows poor seed may expect to be always poor himself.

A Seed Plot
(Mr. Geo. Reid's, Nalangil).

To grow medium or poor quality produce is a waste of time, labour, capital, and land, and has a depreciating effect on the value of the whole industry, as it is difficult to find a market for it, and when sold is unsatisfactory to the buyer, and tends to restrict further business in that direction.

When the bulbs for seed production have been carefully selected, they should be planted in well-prepared soil, in rows from 30 to 36 inches apart, so as to give room for the free use of the horse scuffler between the rows, and the bulbs should be about 18 inches apart. Frequent use of the scuffler between the rows and the hand hoe between the sets is necessary to keep down all weeds, and in dry seasons this will also provide a fine surface mulch, and conserve the moisture in the soil.

In the western districts of Colac and Warrnambool, the planting is done in the month of June; in Gippsland, about a month later. An average crop will yield about 250 lbs. of seed per acre.

Cultivation.

The second essential to successful production is proper cultivation.

The field selected for the crop should be ploughed in April or May for June planting, and not later than June for July planting. When a second crop is to be planted in the same land, the plough may be put in immediately after the removal of the first crop, and the burning of the old skins, tops, and diseased or small onions. The field should be rolled and then gone over with a heavy set of harrows or given a stroke with the spring-tooth cultivator. This work must be continued until the soil is worked into a fine tilth.

If a reasonable interval is allowed between each operation, weed seeds will germinate, and each scuffling or harrowing will destroy the weeds that have developed. Thus, a great deal of labour will be

Another Lot of Onions for Seed
(Mr. G. Reid's, Nalangil).

saved when the crop is growing and weeding operations have to be engaged in.

When the soil has been worked down to a fine tilth and levelled off, it is ready for the seeding operations, but to provide a firm seed-bed the land must be well rolled and then harrowed immediately before the seed is sown.

Except in very small plots or kitchen gardens, onions are not transplanted, but are grown by sowing the seed and thinning out when the young plants are a few inches high.

The sowing is done, usually, with two or three row seed drills, the rows being 9 inches apart, and the crop is then thinned, leaving a space of from 3 to 4 inches between each plant.

The seed may be sown in May, June, or July, and growers will have to be guided by local and seasonal conditions in their choice of the

exact period at which they commence sowing. One, two, and three row drills are obtainable, and with one of these a man can sow from one to four acres per day, according to the number of drills in the machine used and the nature of the soil on which he is operating.

The drills are adjustable, and the seed may be sown thick and then thinned, or it may be sown thin, so that very little thinning will be required. The quantity of seed necessary per acre is from 2 lbs. when sown thin to 4 lbs. if sown thick. The seed should be fresh and of the previous season's production as the viability of old seed is low and cannot be depended upon to give satisfactory results. Not only is the percentage of germination low in old seed, but the plants that do grow lack vigor. Immediately the sowing is completed the field should be well rolled.

For transplanting, the seed will need to be sown in well-prepared beds during February and March. When the surface of the bed has been worked into a fine tilth, the seed may be broadcasted very thickly, and covered to a depth of about half an inch with fine soil, and the bed may be tightened by placing a broad board on it and walking upon it, or by stroking it with the back of a spade or shovel. The plants are ready for transplanting when from 6 to 8 inches high. Before planting out, the roots should be cut back to about 2 inches, and the tops cut down to within 3 or 4 inches of the crown of the plant. If this method is adopted, about 1 lb. of seed will supply sufficient plants for an acre of crop. American growers claim that onions grown from sets will mature fully a month earlier than those grown from seed, but, owing to the greater cost of setting, only a comparatively small area is thus grown.

The young plants from seed-sown crops should begin to show up in about a fortnight, and the surface of the soil should be lightly stirred with a stroke of the "jinglers" (very light harrow). This will preserve the mulch and will also remove any young weeds that may have come through. From this period to the harvesting of the crop the field must be kept free from weeds, by hoeing between the rows and hand weeding between the sets. This continual working of the soil provides an earth mulch, and will conserve the moisture, which is essential to the growth of the crop, especially should the spring and summer be dry, as it very frequently is in the onion districts, during the growing period.

Suitable Soils.

The third essential to successful production is suitable soil. This is usually considered as of first importance, but unless the first and second essentials are fully complied with, success cannot be achieved. Even on the best land, results are dependent on cultural methods.

For the early crop, the sandy loam soil of the Brighton district gives excellent yields, and crops of up to 20 tons per acre have been taken from these fields. The holdings here are small, and there is an abundant supply of stable manure, and with the application of very liberal dressings this land is still giving good results after forty and fifty years of continuous use as market garden areas. The onions

grown on these light soils are, however, as already stated, poor keepers, and only suitable for immediate marketing.

For the late or main crop, the volcanic soils of the Western District and the red and chocolate loams of Gippsland are undoubtedly the most suitable in Victoria, and the onions from these districts are, perhaps, the best keepers and carriers in the world.

Onions from Camperdown, selected and graded under the supervision of the officers of the Department of Agriculture, secured the first prize and gold medal at the Panama-Pacific International Exposition, San Francisco, in 1915.

To grow onions successfully, rich soil, a moderate rainfall, and temperate climate are all necessary. In districts with a heavy rainfall, and in the drier areas, when a wet season is experienced, the bulbs

Home of Mr. Geo. Reid, a successful onion grower.

are much larger and the average yield is greater, but they are softer and lack the keeping and carrying qualities of the medium-sized bulb of the average yield, harvested in a medium season.

The soil should be well drained, and where the natural drainage is not good, pipe drainage of the field is necessary. If, however, this be beyond the financial resources of the grower, or he be a short leaseholder, the alternative is to subsoil the land by ploughing, where the soil will permit, to a depth of 8 or 9 inches. Where the soil is shallow with a clay subsoil, a subsoiling attachment may be fixed to the plough so as to follow the cut of the share in the centre of the furrow and thus loosen the subsoil, and give a drainage to a depth of 8 to 10 inches. Care must be taken to see that the clay is not turned up on to the top of the field.

Manuring and Fertilizing.

As the onion plant is a good feeder, most soils will need to be enriched with a liberal application of farm-yard manure, green manure, or artificial fertilizer.

Where farm-yard manure is used, it should be well rotted before being spread on the field, otherwise the weed seeds contained in the manure will add greatly to the labour of weeding during the growing period of the crop.

The volcanic soils of the Western districts do not respond to artificial fertilizers, and here reliance must be placed on farm-yard manure or on the ploughing in of a green crop when the soil is being prepared for a seed bed. In the rich lands of the Colac district, onions have been grown successfully for eight or ten years in succession without the use of any fertilizer. This, however, appears to the writer to be a mistaken policy, as land continuously cultivated must, sooner or later, become denuded of those essential ingredients of potash and nitrogen, and when this occurs, it will take years to bring it back to its normal state, and suitable for onion culture. Some manure should be applied to the soil yearly to make good the wastage of plant food absorbed by the crop.

In other districts bone and superphosphate is the principal fertilizer used, the quantities varying from 2½ to 4 cwt. per acre. Bonedust contains a large percentage of nitrogen, and when this is used no further application of a nitrogenous fertilizer may be required. But if the crop shows signs of weakness, additional dressing of sulphate of ammonia will be found to be very beneficial.

When applying the sulphate of ammonia, it must not be thrown on the plant, as it would burn the plant. It should be spread between the drills on the surface to the extent of from 1 to 2 cwt. per acre, and lightly worked into the soil with a rake or hoe.

The onion being a surface feeder, the food supply will be carried sufficiently deep and distributed by the first rain that falls after the application of the fertilizer.

In some of the States of America, nitrate of soda is used in place of the sulphate of ammonia, and is fed to the crop three or four times, in quantities from 200 to 300 lbs. to the acre. During the growing period, nitrate of soda, however, is not recommended, as in the event of heavy rains falling it is washed away before the plants can absorb it. Sulphate of ammonia is not so soluble, and, therefore, is less wasteful. Soils and climatic conditions differ so widely that no hard and fast rule can be laid down regarding the kind and quantity of fertilizer to use, and the grower must be guided very largely by what experience has found to be most suitable for his district.

(To be continued.)

WEEDS AND THEIR ERADICATION.

By H. W. Darey, F.E.S., Orchard Supervision Branch, Department of Agriculture.

(Continued from page 714, Vol. XIX.).

Control by Grasses.

The fact that grazing is often of great value in assisting grasses to overcome St. John's Wort can be noticed on roadsides in the Bright district wherever grass is plentiful enough to attract stock. Cattle in their endeavours to get at the grass bite off any shoots of the wort that are present; this continual nipping off weakens and ultimately kills the plants. But where rabbits are numerous they always favour the growth of the wort. These animals, on account of their small size, can be selective in their feeding, and they always leave the wort untouched while eating out the grasses that would otherwise compete with it. Thus although feeding off wort-infested lands by stock assists very materially in the control of this weed, the presence of rabbits has always just the opposite effect.

Should there be much St. John's Wort present it would be advisable to first mow and rake it off before putting stock on the land, as its effects might be hurtful. Risk of harm, however, may be greatly minimized by seeing that the animals always have free access to an abundant supply of salt.

Although Kentucky Blue Grass (*Poa pratensis*) has so far given the best results of any of the grasses tested, there are others that should prove equally as good. *Paspalum dilatatum*, unfortunately, was not a success under the poor cultural conditions obtaining on the plots at Bright. If, however, the ground were first properly prepared and the grass well established, it would certainly overcome St. John's Wort. In places unsuitable for cultivation rooted plants of this grass could be sown.

Fig. 9 shows a plan of the grass plots in the Morgan's Creek and Porepunkah Pine Plantations. The grasses giving the most promise, in their order of merit for wort-control purposes, are as follow:—

Kentucky Blue, *Poa pratensis.*
Hard Fescue, *Festuca duriuscula.*
Cocksfoot, *Dactylis glomerata.*
Red Creeping Fescue, *Festuca rubra.*
Crested Dogstail, *Cynosurus cristatus.*

Some of the grasses such as *Phalaris bulbosa* and Burr Clover, *Medicago denticulata* gave great promise of success last season, but this season they have been completely dominated by St. John's Wort, which has again obtained complete possession of the ground. Even such an aggressive plant as Johnson Grass, *Sorghum halapense*, has had a great struggle and has for the most part died out. Sudan Grass, *Andropogon Sorghum*, and Russian Millet did not appear at all after being sown. Some of the grasses were undoubtedly frost-killed, as frosts were frequent and of exceptional severity, often raising the ground into ridges, thus drying out the young plants.

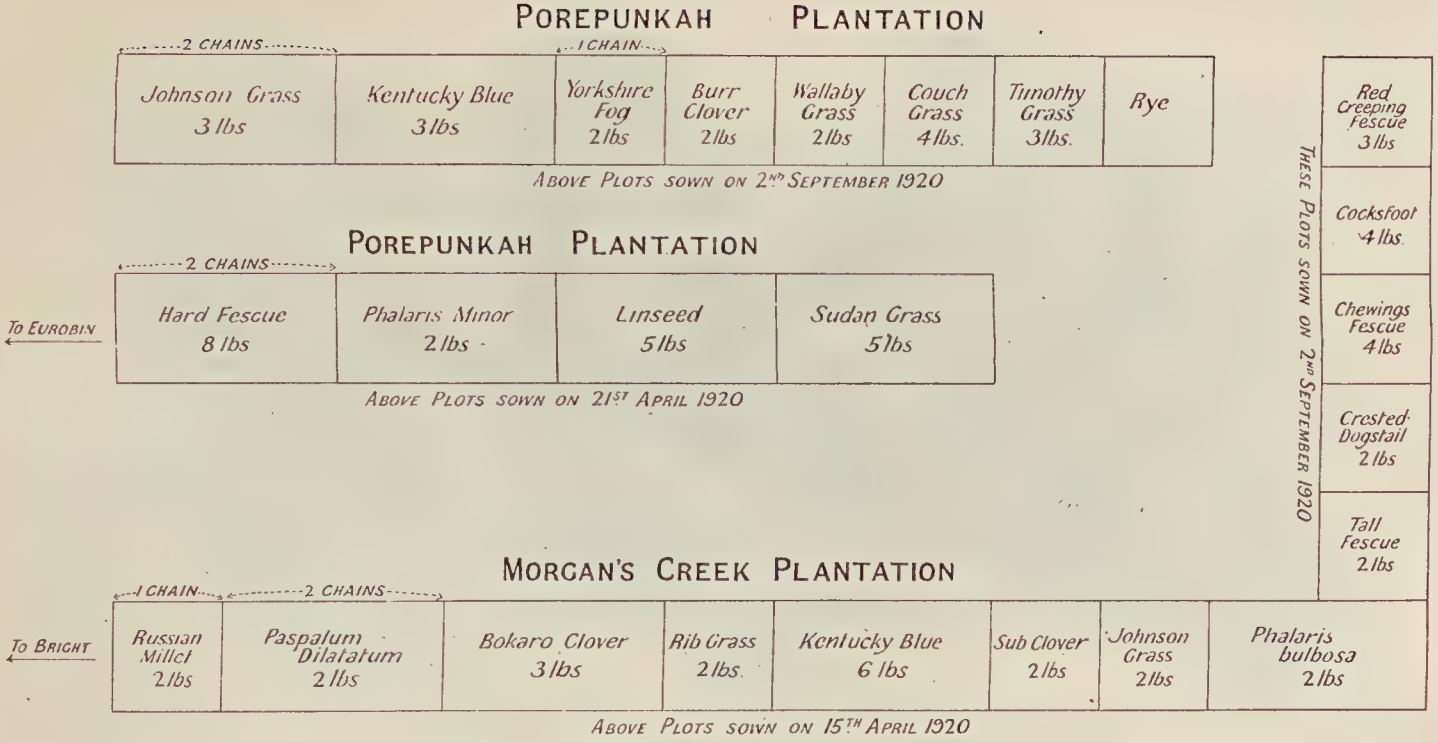


Fig. 9.—Test Grass Plots at Bright for Control of St. John's Wort.

These grass tests, although as yet inconclusive, certainly point the way in which it is hoped that St. John's Wort can be controlled

Fig. 10.—Common Tutsan *(Hypericum Androsoemum).*

from spreading from Crown lands to the lower country yet free from this pest. A belt of strong growing grasses, once properly established,

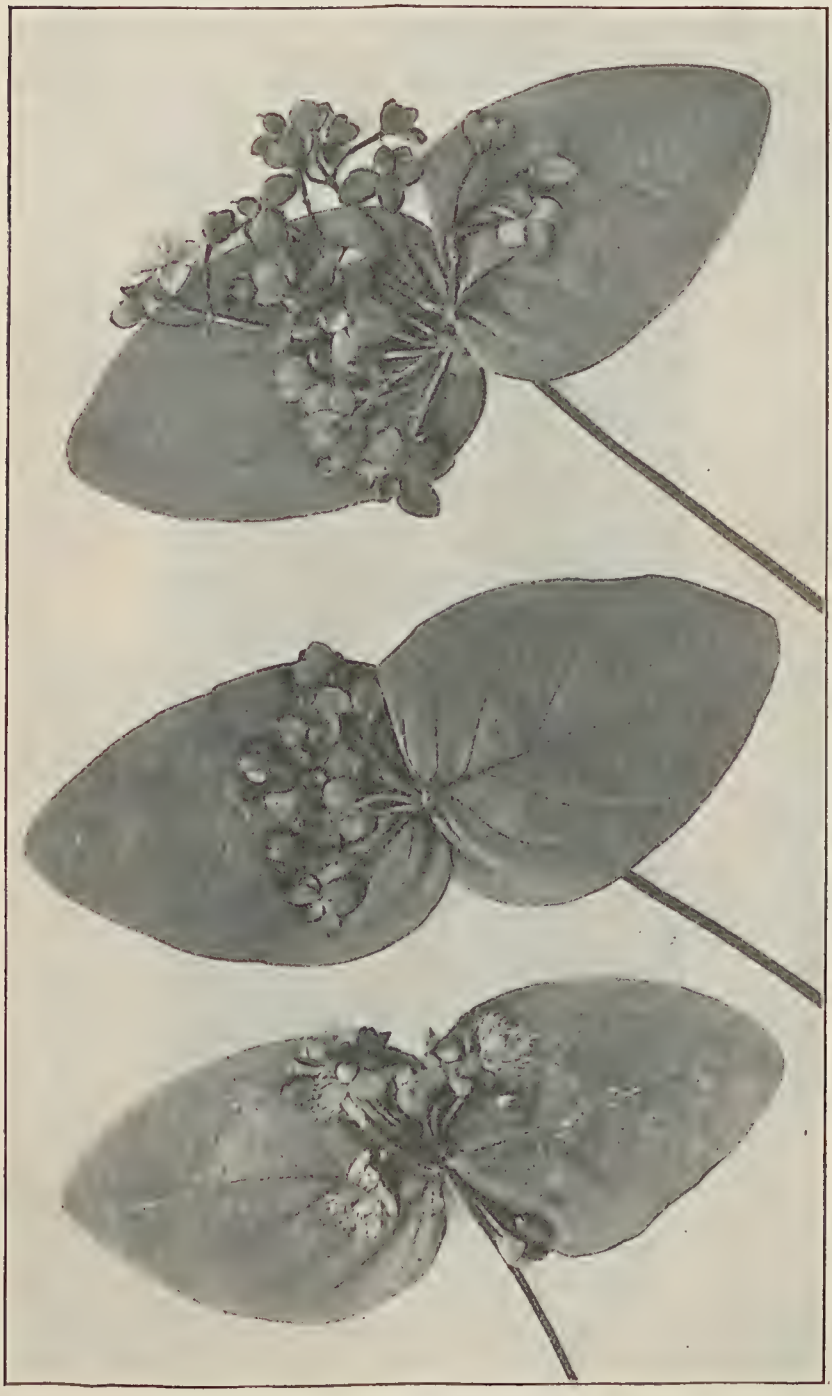


Fig. 11—Flowers and Seed Capsules of Tutsan

would act as a buffer between lands owned by the Crown and those privately held. These belts would intercept and hold seeds from the wort on higher country, and so prevent them from being washed down during heavy rains. Useful as would be these protective belts of strong grasses, they would be of little value unless a crusade against rabbits was carried out at the same time. It would also be necessary to exercise some control over the movements of stock in infested areas at the time when the wort is bearing ripe seed. The same may be said of the removal of farm produce likely to carry seed with it to a clean district.

Fig. 12.—Flowers of *Hypericum Calycinum*.

In the case of land-owners whose land is unfortunately growing this pestilent weed, providing the patches of weed are small, it could be effectively killed by covering the plots completely with sheets of bark or iron. These should overlap sufficiently to exclude all light. In places where timber is plentiful, St. John's Wort can be successfully destroyed by stacking wood on the patches of weed and firing them.

Larger areas should be hand-pulled or mown, the former method being preferable as having a much more weakening effect on the plant than mowing. Salt applications should afterwards be made during hot weather or, as soon as new shoots appeared, they might be sprayed with arsenic, crude petroleum, or brine. But whatever preparation

Fig. 13.—*Hypericum Calycinum.*
New plants being formed at ends of underground stems.

Fig. 14.—*Hypericum Calycinum.*
Three distinct plants arising from same underground stem.

is used on standing plants, it is best applied when the flower stems have appeared, but before they have opened, as the most important thing in the control of this plant is to prevent it from ripening its seed.

On lands that can be cultivated the difficulties attending the eradication of St. John's Wort, although very considerable, are much less than on land fit for grazing purposes only. Crops requiring cultivation during their growing period, such as potatoes and tobacco, are excellent for destroying weeds of all sorts, and the growing of such crops should be of great help in combating this weed. Cereal crops are almost useless for the purpose, as while they are growing, the roots of St. John's Wort will be recovering from the cultivation previously given, so that by the time the crop is ready to harvest the wort will have recovered its vigour, and thus may continue year after year as long as cereal crops are grown on wort-infested land.

The Common Tutsan (*Hypericum Androsæmum*).

This handsome perennial (Fig. 10) is a native of Europe, and is a fairly common plant in Devonshire and Cornwall in England. Unfortunately, like many other introductions into Victoria, it is becoming much too plentiful. In the southern parts of the State, especially in the rough country lying between Forrest and Apollo Bay, Tutsan is now very prevalent. Owing to its great spread during recent years, it has been proclaimed a noxious weed under the Thistle Act for the whole State.

Tutsan is a shrubby plant of striking appearance, growing from 3 to 4 feet high, and is much more robust in appearance than the Common St. John's Wort, *Hypericum perforatum*. The leaves of Tutsan (Fig. 11) are large, egg-shaped, and sessile. During the spring and early summer months its clusters of large yellow flowers make it a conspicuous object. This plant produces a great quantity of small seeds, enclosed in glossy, berry-like capsules, which no less than the flowers are very conspicuous objects, and make it a very easy matter to locate the plant.

The best method of dealing with Tutsan is by hand-pulling it while it is young, and when the ground is in a moist condition. With old-established plants hand-pulling is often difficult owing to their strong woody roots. The best way to get rid of such plants is by grubbing them out with a mattock.

The fact that Tutsan belongs to the same genus (*Hypericum*) as the Common St. John's Wort should be a sufficient warning to landowners to destroy it as soon as its presence is discovered.

The Large-flowered St. John's Wort (*Hypericum Calycinum*).

The large-flowered St. John's Wort has recently brought itself into prominence by threatening to become a very serious pest. It is probably among the handsomest of the Hypericums, having a large yellow flower nearly 3 inches across (Fig. 12). In appearance it is very much like the garden plant *Hypericum Moserianum*, the latter it is stated being a hybrid and *Hypericum calycinum* one of its parents.

Hypericum calycinum is rather a dwarf species, and here it does not usually grow higher than 15 inches. Its leaves are opposite, sessile, and about 2½ inches long by 1 inch in width with reddish stems

of a hard woody nature. It is a most difficult one to deal with, as it sends out long subterranean creeping rootstocks, and these send up fresh shoots at intervals. Fig. 13 gives an excellent idea of these underground runners, with leaves just commencing to develop at their

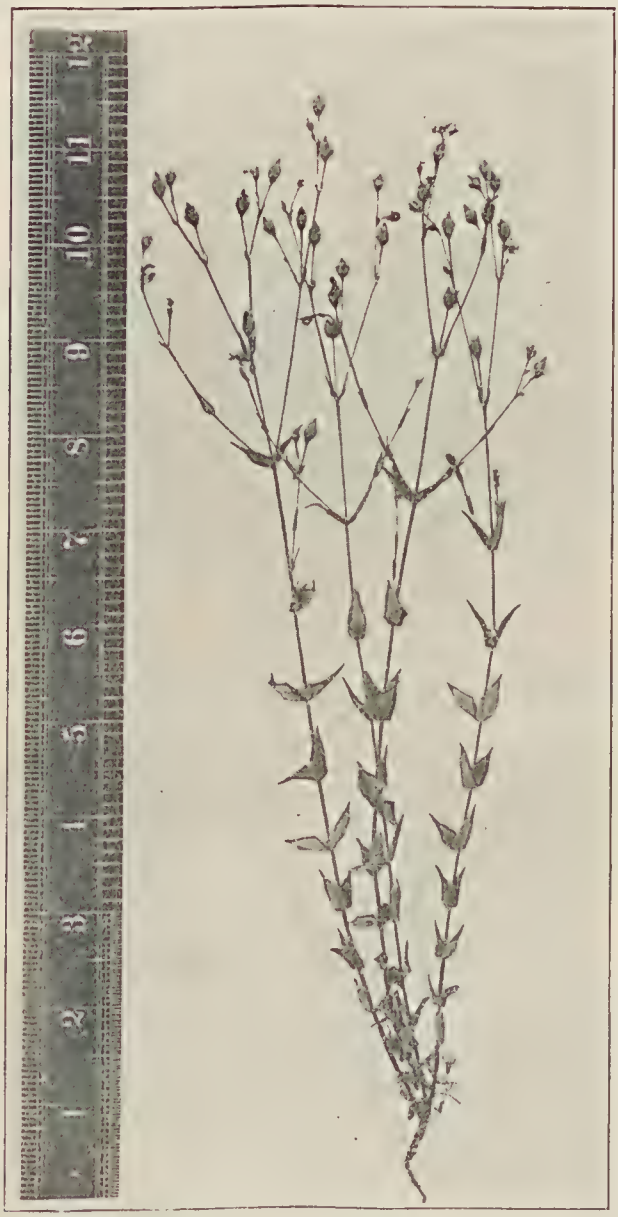


Fig. 15.—The Native Species of St. John's Wort, *Hypericum Japonicum.*

extremities. Fig. 14 shows three distinct plants all attached to the same underground stem, with running rootstocks starting away from these to again form new plants. This, like most of the Hypericums is a heavy seeder. It also grows very freely from any small piece

of the plant (either stem or root), and in addition possesses creeping rootstocks. With these attributes it is almost certain to become a very dangerous pest plant unless it is killed out immediately. Plants that have creeping rootstocks are always hard to eradicate, as where there are rootstocks, hand-pulling is useless, the plant merely breaking off where it is attached to the parent stem, leaving the latter unimpaired and capable of sending up in a very short space of time shoots to replace those pulled.

Hypericum calycinum should be very carefully dug out, and all parts of it collected and burnt. The places in which it grew should be carefully watched for any new shoots from pieces of roots or stems that may have been overlooked, so that on their first appearance they could be destroyed.

This Hypericum is fortunately not a common species in Victoria, and the writer is indebted to the officers of the National Herbarium for its identification. Patches were found growing in the Old Gisborne Cemetery, mostly on grass lands, and also at Mount Macedon, where steps have now been taken for its complete eradication. Fig. 15 shows our small native species of St. John's Wort, *Hypericum japonicum*. This is figured because it is so frequently mistaken for the pest species by people unfamiliar with the appearance of that plant. The Native St. John's Wort is a common plant in the mountainous parts of north-east Victoria, and seldom grows to more than 15 inches high, and is not there considered to be a harmful weed.

(To be continued.)

SCORE-CARDING THE LAYING FOWL.

By A. V. D. Rintoul, N.D.D., Chief Poultry Expert.

The September, 1921, issue of *Utility Poultry Journal* (England) gives a very interesting report of three systems of score-carding the laying hen, as propounded by their respective exponents—

I. The "Powell-Owen" System of Grading and Handling, by Mr. W. Powell-Owen, of the National Utility Poultry Society.

II. The National Poultry Club Service System, by Captain Pierson Webber.

III. The Midland Federation Score-Card, by Mr. A. H. Brain.

Each of the afore-mentioned gentlemen in addition to explaining his methods had the opportunity of going over a total of 48 birds, representing twelve specimens each of Rhode Island Reds, Light Sussex, White Wyandottes, and White Leghorns; the actual trap-nest record of each specimen had been previously recorded, but not made known to the "score-carders." As Mr. Powell-Owen's card scores a maximum of 200 points in all, Captain Pierson Webber's 110, and Mr. Brain's 100, the writer has given the figures in percentages, in order to simplify comparison, as well as the placings in each section. The three score-card systems are given herewith, but it should be borne in mind by the reader that owing to the sad loss of sight from which Captain Pierson Webber suffers, he has to be guided entirely by sense

of touch, in consequence of which he has a much more limited sphere of operation than the other two gentlemen.

THE THREE SYSTEMS.

CAPT. PIERSON-WEBBER'S CARD.

Condition.	Capacity.	Texture.	Type.	Total.	Plumage.	Grand Total.	Remarks.
25	25	25	25	100	10	110	

DEFINITIONS.

By "condition" is meant (A) Suitable weight for age, sex, and breed. (B) Vitality and persistency, being that power which is inherent towards strong constitution and recuperative action. (C) Bloom and cleanliness of feather, horn, skin, and flesh. (D) Seasonable precocity and fertility.

By "capacity" is meant that proportionate length, width, and depth, which provides ample room for the development of the ovaries as well as freedom of action for heart and lungs.

By "texture" is meant the hereditary refinement of horn, bone, skin, flesh, and feather.

By "type" is meant the careful adjustment of points of utility merit, to meet essential breed characteristics, so as to conserve as far as possible the work of the fancier and at the same time eliminate all that upsets true proportion and texture.

MR. BRAIN'S CARD.

Utility Characteristics.					Ideal Standard Value.	Score.
Condition	Weight Size	Active, Vigour Healthy			10	
Head	Eye Comb	Lobes Wattles	Face .. Beak	Skull	10	
Back	Length Width				10	
Breast	Shape Length and Proportion	Straight			5	
Body	Formation Fluff and Feather				10	
Wings Tail	Legs Toes	Scales			5	
Texture					20	
Abdominal Capacity	Pubic Bones to Keel				15	
Pubic Bones	Gap (absence of meat, gristle, and fat) Straightness and Type				15	
		Total			100	

MR. OWEN'S CARD.

Capacity. Fingers.	Points Possible.	Points Awarded.	Capability.	Points Possible.	Points Awarded.
End of breast bone to pelvic 1	4		Pelvic bone .. v. thick	3	
2	8		thick	6	
3	12		thin	9	
4	16		v. thin	12	
5	20		If straight add	3	
Between pelvic bones 2	2½		Flesh .. .. coarse	5	
3	5		medium	10	
			fine	15	
Between pelvic and tail bone 1	5		Vent .. .. size	5	
2	10		fineness	5	
Width of back .. medium	3		Head-points .. medium	3	
good	6		good	6	
v. good	10		v. good	10	
Length of back .. medium	2½		Bone and horn .. coarse	3	
good	5		medium	6	
			v. good	10	
Width between legs medium	3		Feather .. excess	3	
good	6		medium	6	
v. good	10		ideal	10	
Length, depth, and medium	3		EXHIBITOR—		
width of abdomen good	6				
v. good	10				
Total	70		Total	70	

Breed Characters, &c.	Points Possible.	Points Awarded.	Grand Total.	Points Possible.	Points Awarded.
Show condition	10		Capacity	70	
Health	10		Capability	70	
Size (ideal utility) ..	10		Breed characters, &c. ..	60	
Breed characters	30				
Total	60		Total	200	

The Result of Score-Card Judging.

RHODE ISLAND REDS.

Percentage of Points.

—	Actual Record in Eggs.	Brain.	Webber.	Owen.
No. 13	274	65½	67	66
,, 7	216	80½ (3rd best)	74 (res.)	78
,, 10	192 (nine months)	73½	73 (v.h.c.)	79
,, 3	196	78½ (v.h.c.)	72 (c)	86 (1st)
,, 4	195	71½	73 (h.c.)	79
,, 9	191	74½ (c)	86 (1st)	81½ (v.h.c.)
,, 11	189 (nine months)	71	77 (3rd)	83 (res.)
,, 2	185	83 (1st)	73 (h.c.)	81 (c)
,, 6	188	80 (2nd)	80 (2nd)	84 (2nd)
,, 8	184	78½ (h.c.)	71	81 (h.c.)
,, 12	179 (nearly nine months)	73½	66	83½ (3rd)
,, 5	175 (nine and a-half months)	80 (res.)	68½	80

The three judges in the above section all failed to find the only decent layer there, and failed to agree amongst themselves in the placings of moderate layers, none of which would be considered worth breeding from in Australia.

LIGHT SUSSEX.

Percentage of Points.

—	Actual Record in Eggs.	Brain.	Webber.	Owen.
No. 15	222	68½	82 (2nd)	74½
,, 18	222	74	67	82½ (res.)
,, 21	212	72½ (c)	61½	74
,, 25	207	74½ (h.c.)	79 (res.)	75
,, 17	180	77 (2nd)	68½ (h.c.)	78
,, 16	175	75½ (v.h.c.)	68 (c)	77½
,, 14	171	66	66	83 (2nd)
,, 19	160	70½	77½ (v.h.c.)	77
,, 24	160	78½ (1st)	35½	74
,, 22	156	65	49	..
,, 20	155	76½ (3rd)	81½ (3rd)	82¾ (3rd)
,, 23	148	76 (res.)	84½ (1st)	83¼ (1st)

In this section again the judges more or less missed the best birds, and selected the worst.

WHITE WYANDOTTES.

Percentage of Points.

—	Actual Record in Eggs.	Brain.	Webber.	Owen.
No. 36	191	72	66	..
„ 41	191	81½ (1st)	76½ (res.)	83 (2nd)
„ 38	190	72½ (c)	68 (c)	..
„ 45	189	74 (v.h.c.)	59	76¾
„ 39	175	64	65½	80¼ (res.)
„ 35	162	72½	67	80¼ (res.)
„ 43	156	81 (2nd)	79½ (2nd)	82 (3rd)
„ 42	140	71½	68½ (h.c.)	76¼
„ 34	139	65½	84½ (1st)	71¾
„ 37	133	73½ (h.c.)	74 (v.h.c.)	79¾ (v.h.c.)
„ 40	127	77 (3rd)	78 (3rd)	85¾ (1st)
„ 44	122	75 (res.)	66	74½

The judges were more successful apparently in getting on to one of the two highest scorers, but again seemed to have a fancy for the poor layers.

WHITE LEGHORNS.

Percentage of Points.

—	Actual Record in Eggs.	Brain.	Webber.	Owen.
No. 74	187	70½	78½ (h.c.)	86½ (v.h.c.)
„ 77	174	80 (3rd)	90 (1st)	88¾ (2nd)
„ 68	170	83 (1st)	79 (v.h.c.)	88 (3rd)
„ 76	165	78 (v.h.c.)	72	86½ (res.)
„ 71	155	64½	24	..
„ 70	151	66½	85½ (2nd)	81¼
„ 75	150	71½ (c)	82 (3rd)	78¾
„ 78	145	80½ (2nd)	74 (c)	84
„ 79	137	73½ (h.c.)	71	85¼ (h.c.)
„ 73	132	70½	80 (res.)	73½
„ 69	119	80 (res.)	67½	89 (1st)
„ 72	116	57	68	73½

In this section the judges seemed more at home with the 2nd, 3rd, and 4th birds, but again Mr. Powell-Owen's "system" seemed to attract about the worst layer for first prize, as in three different sections he awarded first prize with 89 per cent., 85¾ per cent., and 83¼ per cent. to birds that had laid 119, 127, and 155 eggs respectively, whereas a bird that had laid 274 was only accorded 66 per cent. One cannot help wondering what marks would have been accorded to Mr. C. E. Graham's world's record, 335 egg bird on the "Powell-Owen" system?

Captain Pierson Webber claims for his system, introduced in 1917, that it was the first known in Great Britain, the other systems being evolved later. In 1916, however, the Department of Agriculture, Vic-

toria, laid down the standard for "utility" points, which is as follows:—

Utility Breeds.

General Appearance.—Bright, active, and healthy. The first essential a well developed, vigorous constitution, giving evidence of ability to transmit similar qualities.

Head.—Rather long in light breeds, and lean, narrowing somewhat at the back of the skull. Heavy breeds shorter in skull, and fractionally deeper.

Eyes.—Full and bright. Colour rich orange red, except in case of certain breeds such as Black Orpington, Langshan, Minorca, &c., when eyes should be dark brown almost to black.

Face.—Bright and clean. Free from feathering.

Comb.—Thin and fine in texture, thickening as little as possible towards the base. Dubbing to be recognised in the case of second season, or older roosters in the light breeds.

Wattles.—Thin, and of finest possible texture.

Neck.—Fine and fairly long.

Body.—Long, deep, and wedge-shaped, similar to that of the milch cow, wide across the saddle.

Breastbone.—Straight and fine.

Pelvic Bones.—Thin, pliable, fairly long and straight, set at considerable distance from point of breastbone.

Skin.—Texture of skin of abdomen to be of thinnest and finest quality, very elastic.

Legs.—Not high, and set well apart.

Tail.—Full and flowing, not set at too high an angle, with good sickle and hackle feathers.

Feathers.—Profuse, but close and flat on the bird.

Weight (Minimum).—Six months pullets, White Leghorns, 3½ lbs. Six months pullets, Black Orpingtons, 5 lbs. Others in proportion.

Principal Light Breeds.	Principal Heavy Breeds.
Ancona.	Faverolles.
Andalusian.	Langshan.
Campine.	Orpington.
Hamburgh.	Plymouth Rock.
Leghorn.	Rhode Island.
Minorca.	Sussex.
Sicilian Buttercup.	Wyandotte.

Australian poultry breeders, to whom scores of 240 to 270 are the merest every-day affair (and being quite familiar with birds going well over the 300), will disagree with Mr. Brain's allowance of only 10 per cent. in all for eye, comb, lobes, wattles, face, beak, and skull, many breeders attaching fully a third of the total value of the bird to head properties alone. At any rate, no one would be at all likely—in Australia—to agree that the abdominal capacity from pubic bones to keel should count half as much again as the head properties, *i.e.*, 15 per cent. for capacity against 10 per cent. for head properties! No less than ten out of the forty-eight birds examined by Mr. Brain scored 80 per cent. or higher. It is commonly reported of Mr. George Raper (one of the ablest all-round, living judges of dogs) that the *best* dog

of all breeds *he ever saw* would have scored about 75 per cent. on the score-card. If the ten birds therefore whose records averaged about 173 could score from 80 per cent. upwards, what score can be credited to the 300-egg bird?

One of the secrets of score-card judging is to leave ample margin *in case* the perfect specimen should ever appear. Not long ago a well-known judge told the writer that it once fell to his lot to have to score-card game bantams. He valued the winner of the first class at 68 per cent., but as time went on, in subsequent classes, he unconsciously lowered his standard, thereby raising his marks, with the result that the winner in the last class scored over 90 per cent. A valuable silver cup was on offer for the best in the show, for which he unhesitatingly selected the 68 per cent. winner, and protests that the highest scorer should be given the prize met with the response from the judge that whatever the scores were, "68 per cent. was the best bird." It is extremely doubtful if there exists any poultry enthusiast who could score-card 40 utility birds twice running in the same order, even let alone being able to allot the same number of marks to each bird on the second occasion.

The score-card is merely a guide as to the proportionate value of the different characteristics to enable the novice to get some idea of value; to the experienced breeder *who knows*, it is more of a hindrance than help, as the most important point of all—BALANCE—is almost invariably omitted. Two specimens may vary in this respect, one may be good in each *individual* characteristic, but by being out of balance would be of less actual value than the other specimen, which, while not perfect in any characteristic, is symmetrically balanced.

To the writer, however, the "Powell-Owen" system is distinctly the least valuable of the three systems, the mathematical system of measurements in any utility poultry score-card being abhorrent. To start with, the "Powell-Owen" system only allows a five-finger capacity from end of breastbone to pelvic bones. What of those birds that measure six, and, on occasion, seven fingers? Consider also the width between the pelvic bones—a maximum of three fingers—whilst in Australia thousands of birds can be found that measure four fingers!

The writer has never yet found that much reliance can be placed on these measurements, the principal objection being their extreme variability from week to week in the same bird. It is doubtful if the score-card will ever help us either to discover in the saddling paddock at Flemington the winner of the Melbourne Cup, or at Burnley the 350-egg bird!

CROP CAPACITY AND CONSTITUTION.

A feature of the three systems is that not one of them refers to "crop capacity." Doctors differ, and so do poultry experts, but the majority of experienced egg farmers are agreed that fully 75 per cent. of the value of the bird can be determined on inspection without handling; in other words, "ground picking" is infinitely superior to handling for measurements. *Egg record alone is the worst possible system of breeding any one can adopt*; that way is certain disaster. Constitution must always come first, and a weakly, delicate bird is of no breeding value, whatever her score might have been.

Unless there is crop capacity to receive and commence digestion of the heavy feeding that is essential in order to maintain the enormous output of eggs under "test" conditions, she would not be likely in the subsequent breeding years to be the mother of healthy, vigorous chickens. The bird, therefore, that "cuts away in front" should be omitted from the breeding pen, and in consequence should never be given the opportunity of trap-nest or single pen.

EXPLANATION OF POINTS IN SELECTION.

Fineness of Skull.—As the skull will undoubtedly thicken with age, fineness is necessary for a good layer, coarseness not being compatible with consistent laying. The heavy breeds should be shorter in skull than the light breeds, as the long-headed heavy breeds are liable to weaker constitution, earlier moult, and inability to go on laying right through the moult.

Eyes.—Full and bright. Roundness and prominence of the eyes are indicative of vitality and fecundity. With age the eye sinks into the skull, hence the necessity to avoid much space from the eye to the back of the nostril, which would increase the orbital cavity.

Face.—Bright and clean, free from feathering. Experience has shown that the best layers are invariably clean faced.

Comb.—The comb thickens with age, and also with excessive meat feeding, so that stud roosters—meat fed—are usually dubbed to avoid the unnecessary drain on the system in the shape of blood required to support a large comb, but, though simple and harmless, this operation is positively prohibited in Great Britain.

Neck.—Fine and fairly long in order to preserve fineness and quality. A short-necked bird is usually thick-necked and coarse.

Body.—Spring of rib is desirable, a flat-sided bird is usually of weak constitution.

Breastbone.—Straight and fine, a crooked breastbone being an indication of hereditary weakness. It should be observed that a crooked breastbone is by no means the same as an indented breastbone caused by too early perching.

Pelvic Bones.—Scant importance need be attached to the distance between the bones themselves, which depends to a certain extent on the proximity of the laying of the next egg. Fineness of the bones depends somewhat on age, which causes a gradual thickening. It is by no means uncommon to find one bone thicker than the other, in which case the writer has usually found the right pelvic the thicker of the two. Incurvation is frequently met with, and can easily be caused by overcrowding of chickens in the brooder, the bones being easily distorted at an early age. If there is any value at all in handling the birds, it is then of the utmost importance to also handle the male bird. "Like begets like," and the result of running a poor spaced male with good spaced hens can be gauged by "Mendelism."

Skin.—The texture of the abdomen varies in accordance with the laying condition of the hen, but fineness and pliability are very desirable. Dairy cattle buyers will—in the market—test the fineness and pliability of the skin on the ribs of a cow, any tendency to being hide-bound, or even coarse-skinned, being a common cause of rejection.

Feathers.—The tighter or closer-feathered the bird is, the warmer she will be in winter. Consequently will require less food to maintain body heat, and more will be available for egg production. The loose-feathered bird is more liable to moult early, and will not lay through the moult, as she loses all her feathers at once. A good layer will go bare and red about the head, but moults gradually, the new feathers working through the old, causing less drain on the system, and enabling her to continue laying. The full "quill" moult leaves the bird colder, and makes a drain on the food supply—a drain accentuated by the formation of a complete set of new feathers all at the one time.

. . . . . .

Relying on the Victorian system of selection, it was possible to predict the first 300-egg bird in public test in this State, whilst the following year, on the same system, it was confidently expected of Mr. C. E. Graham's 335-egg bird, even before she laid an egg, that she would make a record.

The Indian Government has imported from Victoria birds that have defeated all British importations in the laying pens, and undoubtedly there is ample room for an enormous trade in stud birds between Australia and Great Britain.

The prices quoted for typical layers of vigorous constitution usually do not exceed about £3 3s. for females and £5 5s. for males, so that there is nothing to prevent the English breeders importing some of the actual stock that have made Australian fowls famous throughout the world, a state of affairs largely brought about by a fairly thorough understanding in the first instance of how to select breeders; secondly, how to select layers; and, lastly, how to feed to get the best results.

An exchange of ideas from opposite ends of the world can do no harm, and if better methods of selecting the most profitable layers can be arrived at by "eye" selection—the natural British method of judging the value of all live stock—then the poultry industry in general must reap the benefit.

CROP AND FALLOW COMPETITION, MINYIP, 1921.

Report of Judge, J. Keane, B.Ag.Sc., Science Field Officer.

The crop and fallow competition conducted by the Minyip Agricultural and Pastoral Society this year comprised four sections, for which a total of twenty entries was received.

Seasonal conditions throughout the Wimmera have, this year, been eminently suitable for wheat-growing, and some excellent crops have been produced. Those seen at Minyip were particularly heavy, and high yields should be obtained throughout the district. In fact, so uniformly prolific were the crops, that considerable difficulty was experienced in placing them in order of merit.

Details of Results.

SECTION 1.—BEST HALF OF FARMER'S WHEAT CROP—NOT LESS THAN 50 ACRES.

Name.	Yield.*	Trueness to Type.	Evenness.	Disease.	Weeds.	Total.
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**
A. H. Krelle	35	18	15	11	14	93
Murphy Bros.	35	19	14	10	14	92
H. A. Niewand	32	17½	13	14	12½	89
Boschen Bros.	28	19	13	14	12½	86½
J. A. Pipkorn	29	17	12	15	13	86

* In connexion with points allotted under "Yield," it should be noted that these do not correspond with the estimated yield in bushels. The method adopted is to award the highest yielding crop the full points, *i.e.*, 35, and with the remaining crops to take off one point for each bushel difference in the estimated yield. The estimated yields were in each case higher than the figures shown.

The winning crop in this section was that of Mr. A. H. Krelle, of Coromby. It consisted of a 112-acre paddock of Federation. It was a very heavy crop, well headed, even, reasonably true to type, and with few weeds. Portion of the crop was grown on summer fallow, the land being scarified in March and again in September. The balance (62 acres) was ploughed in August and harrowed twice in September. The whole of the paddock was scarified in October and again in November. It was harrowed in November and again early in December after rain. At the end of January and in May it was worked with the spring-toothed cultivator. Early in July it was sown by means of the combined spring-toothed cultivator drill and then harrowed. Seventy-five lbs. of seed and 120 lbs. of superphosphate per acre were used. Since 1915 this paddock has been sown to wheat every second year, four crops having been taken off in the last seven years.

Factors which probably contributed to the success of this crop were the thorough working of the fallow, the heavy seeding, and the liberal dressing of manure. In this connexion, it is worthy of note that in the experimental plots at Longerenong College 75 lbs. of seed with up to 2 cwt. of superphosphate has given the most profitable results.

The second place was awarded to Messrs. Murphy Bros., of Burrereo, for a very fine crop of 120 acres of Federation. Only a very few "strangers" were present; the crop was very even and comparatively free from weeds. As with Mr. Krelle's crop, portion of this was sown on summer fallow and portion on winter fallow. That portion on summer fallow promised to yield a little heavier than the latter. The working of the paddock, which is mainly black land with a few red patches, was as follows:—Forty acres were summer fallowed in April by means of the skim plough; it was then left till July, when it was scarified, harrowed, and cross-harrowed. It was next scarified early in October and again twice harrowed. It was then harrowed in December and again in April. The remaining 80 acres were skim-ploughed in July, followed by a harrowing and cross-harrowing, scarified in September, again harrowed and cross-harrowed, harrowed again in December, and then harrowed twice towards the end of March. The

whole paddock was then scarified and drilled with the combined drill in July. It was harrowed after the drill. Sixty lbs. of seed and 90 lbs. of superphosphate per acre were used. In addition to this crop, Messrs. Murphy Bros. showed 127 acres of Federation sown on a well-worked winter fallow.

The Winning Crop—Mr. A. H. Krelle's 112 acres of Federation.

Messrs. Murphy Bros.' Fine Crop of Federation.

Mr. H. A. Niewand's crop of Federation was placed third. This consisted of two paddocks each of 60 acres, and both summer fallowed. The ploughing was done in March, and both paddocks were scarified in July, and harrowed. They were then scarified in October, and in February were harrowed after rain. They were again scarified in April and again in June, after which 65 lbs. of seed and 112 lbs. of super. were drilled in. The drill was followed by the harrows. The rotations practised on these two paddocks over the last four years have been, respectively: (1) Wheat, oats, fallow, wheat; and (2) Wheat, grass, fallow, wheat. The crop, which promised to yield well, contained a fair number of "strangers," and was slightly affected with "flag smut."

A nice crop of 90 acres of Federation was shown by Messrs. Boschen Bros., but it was much lighter than either of the placed crops. The seed, which was obtained from Longerenong College four years ago, is fairly pure, only a very few foreign varieties being present. The paddock was summer fallowed in March. Seventy lbs. of seed and 90 lbs. of superphosphate were sown during the second week in June.

Mr. J. Pipkorn, of Burrereo, exhibited 65 acres of Federation sown on summer fallow, which was skim-ploughed in March and again in August, harrowed twice in September, scarified and harrowed in October, harrowed again early in February, then scarified and drilled about the end of June. The land was harrowed after the drill. Sixty lbs. of seed and 112 lbs. of super. per acre were sown.

A Heavy Crop of Penny—Mr. P. C. Schultz, Kewell.

SECTION 2.—FOR THE BEST CROP ON FALLOWED LAND—THE FALLOW JUDGED 1920, AND THE CROP ON THE FALLOW 1921.

In this section the fallow (not less than 100 acres) was judged by Mr. H. A. Mullett, B.Ag.Sc., in 1920. The points awarded for the fallow are added to the points obtained by the crop grown on that fallow.

DETAILS OF RESULTS.—SECTION 2.

Name.	Yield.*	Trueness to Type.	Evenness.	Disease.	Weeds.	Total for Crop, 1921.	Total for Fallow, 1920.	Grand Total.
Possible points ..	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
A. H. Krelle ..	35	18	15	11	14	93	99	192
A. D. McGilp ..	32	18	14	15	14	93	94	187
A. Lutze ..	32	18½	15	13½	11	90	88	178
H. A. Niewand ..	32	17½	13	14	12½	89	89	178
P. C. Schultz ..	32	17	13½	13½	12	88	89	177
R. J. Cowan ..	28	16½	12½	14	12½	83½	88	171½
F. Burton ..	29	19	13	13	13	87	80	167

* See note under Table I.

The crop shown by Mr. Krelle in this section was the same as that which was awarded the first place in Section 1. The total number

of points gained by the crop is 93, and by the fallow (judged in 1920) 99, giving a grand total of 192.

Second place goes to Mr. A. D. McGilp, who showed a very fine crop of 120 acres of Federation. This land was ploughed in July, and immediately harrowed and cross-harrowed. It was scarified in September, and harrowed in October, December, and January—each time after rain. It was scarified early in June, and towards the end of the same month was sown by means of the spring-toothed combination drill and harrowed. At the commencement of sowing 80 lbs. of seed per acre were used, but towards the end this was increased to 85 lbs. A dressing of 100 lbs. of super. per acre was applied. The crop was not quite as heavy as that of Mr. Krelle, and contained a few strangers, but it was even, and, with the exception of an occasional "dead-head," free from disease. Very few weeds were present. The points awarded to Mr. McGilp for the crop are equal to those obtained by Mr. Krelle, *i.e.*, 93. In 1920, Mr. McGilp's fallow obtained 94 points, giving a grand total of 187.

Mr. A. Lutze's New Residence at Coromby.

Next in order come Messrs. A. Lutze and H. A. Niewand, with a total of 178 points each. Mr. Lutze showed a very even crop of 144 acres of Huff's Imperial, a variety which he prefers to Federation. With the exception of a little Federation, the seed was true to type. Most points were lost for weeds, there being a considerable undergrowth of barley grass and mustard, also a fair number of wild oats. All except 30 acres of this crop was grown on summer fallow, ploughed in March to a depth of 4½ inches, and harrowed early in July to break up the clods. In early September 50 acres were reploughed on account of a heavy growth of rubbish, the remainder being scarified and the whole harrowed. Late in October the paddock was scarified again, harrowed in January, and again in March, and scarified towards the end of May. In July, 60 lbs. of seed and 100 lbs. of manure were sown with the combined drill. The crop shown by Mr. Niewand in this section was the same as that reported in Section 1.

Mr. P. C. Schultz's crop comprised 125 acres of Federation and 67 acres of Penny, all grown on summer fallow. The Federation was sown at the rate of 75 lbs. and the Penny at 85 lbs. per acre, with 90

lbs. of manure. The seeding was done with the combined drill (set tyne) about the middle of July. The Penny was very true to type, and promised to yield well, but, unfortunately, it has gone down in parts, particularly in the hollows. Mr. Schultz prefers Penny to Federation, and has obtained some good yields from that variety. In the experimental plots conducted by Mr. G. Coutts, at Warracknabeal, for the Department of Agriculture, Penny has, over a period of four years, averaged 1½ bushels per acre better than Federation. However, it is disliked by many farmers owing to its tendency to lodge.

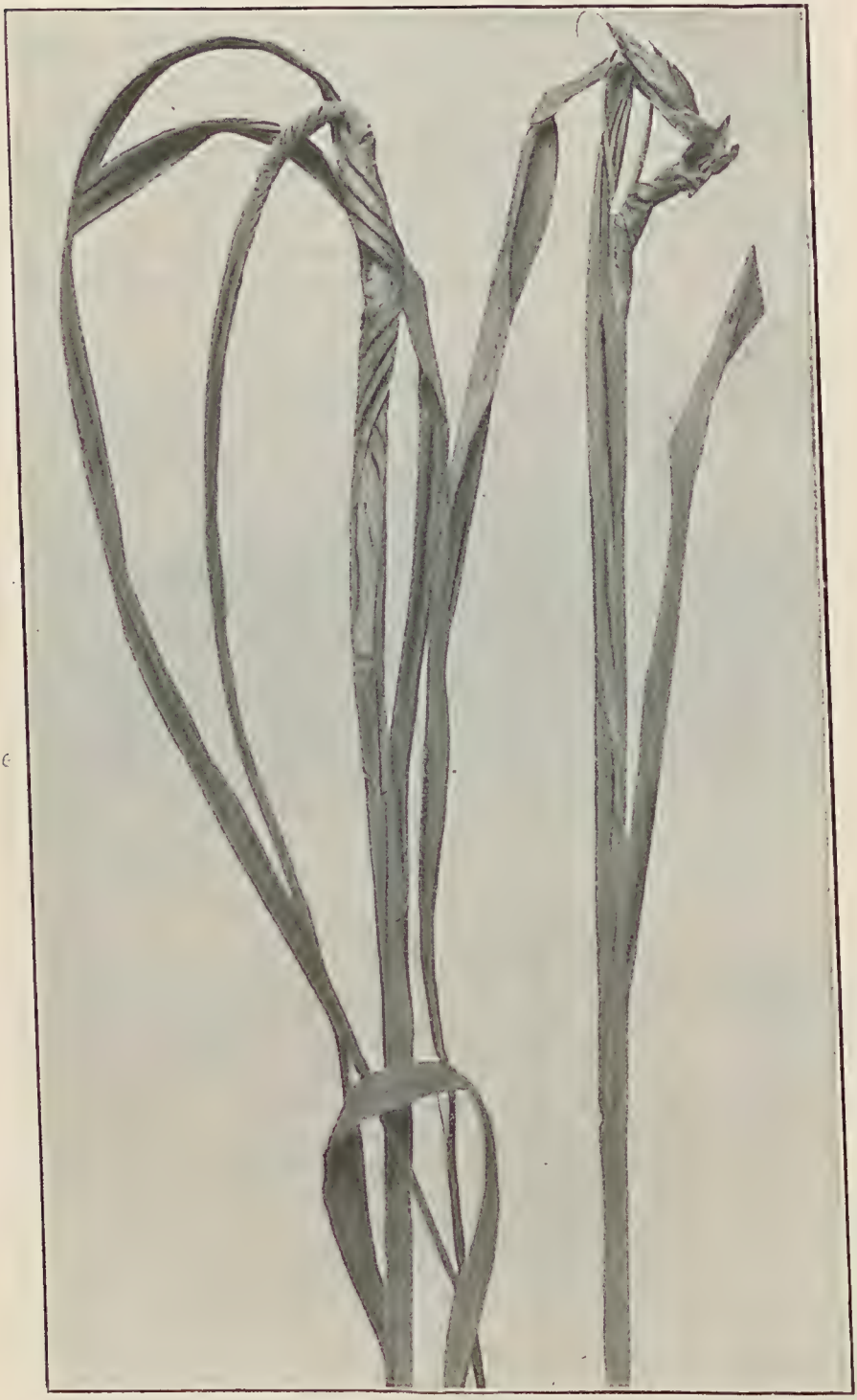
Messrs. R. J. Cowan and F. Burton both showed very creditable crops of Federation, but they were not as heavy as those of the other competitors in this section.

Messrs. Boschen Bros. Homestead.

SECTION 3.—FOR BEST FALLOWED LAND—NOT LESS THAN 100 ACRES.

Name.	Moisture.	Mulch.	Weeds.	Cultivation.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
Barry and Lightbody ..	25	22	22	24	93
T. C. Leslie	25	22	24	20	91
H. A. Niewand	25	21	22	22	90
W. Schodde	25	20	23	22	90
J. Ruwolt	25	21	21	22	89
Executors of late Duncan McGilp	25	21	21	20	87

The winning fallow was that of Messrs. Barry and Lightbody. It consisted of a 100-acre paddock, mainly black soil. As in all other fallows seen, the moisture content was high. In fact, owing to the heavy rains this season the value of the moisture test has been entirely eliminated, and it was possible to separate the fallows only with regard to the character of the mulch, the efficiency of the cultivation, and the presence or absence of weeds. Messrs. Barry and Lightbody's fallow had a fine, mellow mulch, about 2½ inches deep, but slightly set down by the recent rains. The consolidation of the underlayers was all that could be desired. This land was summer fallowed with the scarifier in April to a depth of 2½ inches. In July it



Flag Smut of Wheat.

[From The Smuts of Australia, by D. McAlpine

was skim-ploughed 3 inches deep, harrowed twice in September, scarified towards the end of September, again early in October, and again late in October. Sheep were put on whenever any rubbish appeared.

Mr. T. C. Leslie's fallow, which was awarded second place, had a fair mulch and only a very few weeds, but in some parts the desired consolidation had not been effected.

The remaining fallows lost points for defective mulches, insufficient consolidation, and the presence of barley grass and other weeds.

SECTION 4.—FOR BEST CROP GROWN ON FALLOW LAND—THE FALLOW TO BE JUDGED IN 1921, AND THE CROP GROWN ON THE FALLOW IN 1922.

In this section only two entries were received—those of Messrs, Barry and Lightbody and H. A. Niewand. The fallows shown were the same as exhibited by these competitors in Section 3, and the points awarded are identical with those given under that section.

Name.	Moisture.	Mulch.	Weeds.	Cultivation.	Total.
Possible points	25	25	25	25	100
Barry and Lightbody ..	25	22	22	24	93
H. A. Niewand	25	21	22	22	90

SOME NOTES ON THE COMPETITION.

(*a*) SUMMER FALLOW.

An outstanding feature of the competition this year is the fact that of, approximately, 1,300 acres of crop entered about 900 acres were grown on summer fallow, while of the fallows judged all were summer fallow. It must be admitted that in most of the crops where portion was summer fallow and portion winter fallow, very little difference could be seen. This is, no doubt, due to the exceptionally favorable season experienced, but most of the competitors were of the opinion that, in an average year, the summer fallow yields at least one and a half bags more than winter fallow. Probably the most suitable procedure is to do portion of the fallowing during February, March, or April, and the remainder after seeding is completed. This allows a more even distribution of the work of the farm, and does away with the rush entailed in getting the whole area fallowed in winter. Another important advantage of summer fallow is that it greatly facilitates the cleaning of the land. Longer time is given for the germination of rubbish, and, consequently, there are more opportunities for getting rid of it.

(*b*) FLAG SMUT.

Very little "take-all" was noticed this season, but "flag smut" was present to a slight extent in most of the crops. This is a disease somewhat similar in its effect to "take-all." It attacks the flag, causing it to curl up and become twisted and distorted, while the ear is seldom formed. At first the leaves show long, grey streaks running parallel to the veins. Later these streaks burst, exposing the black powdery spores, the appearance of the disease at this stage having earned for it the name of "black rust." It is capable of causing considerable loss, and where it is noticed in a district preventive measures should be taken. The main source of infection is

the diseased leaves, which lie in the ground till the succeeding crop is sown, and thus the young seedlings become infected. Since this is so, pickling the seed has no effect on the disease. The most effective remedies are: (1) a good stubble burn; (2) early fallowing with thorough working of the fallow; and (3) the inclusion in the cropping system of oats, a crop not affected by the disease. Since the spores can pass unharmed through the digestive organs of the horse, diseased hay should not be used for chaff.

Rate of Seeding and Manure.

The amount of seed per acre sown by the competitors varied from 60 to 87 lbs. This is a very considerable variation, and it is obvious that there must be some particular rate of seeding more profitable than any other. As no tests have been carried out in the Minyip district, it is not possible to say with any degree of certainty the rate of seeding most suitable, but at Longerenong College, where the conditions are somewhat similar, a seeding of 75 lbs. per acre has given the best results. Somewhat the same variation exists with regard to the amount of manure applied. The dressing favoured by the competitors varied from 60 to 120 lbs. per acre, the heavier dressing being used by Mr. Krelle on the winning crop.

In conclusion, I desire to thank the members of the Society for their hospitality, and the secretary, Mr. J. D. Heckle, for his valuable assistance and co-operation during the judging of the competition.

TOMATO WILT EXPERIMENTS.

Summary of the Bendigo Experiments for the Prevention of "Spotted Wilt."

SEED.

Plots were planted with different varieties, mainly the commercial ones grown in the district. Old seed was used in some of the plots, and in others new seed. Some of the seed was seven years old, consequently it was grown long before the "wilt" appeared in the State. Seed from affected plants was sown in order that results might be compared with those from seed of healthy plants. Some seed was pickled with corrosive sublimate and some with formalin, so that results from each might be compared and both with results from non-pickled seed.

SPRAYING TESTS.

The following sprays and dusting powders were used:—

Bordeaux Mixture (summer and winter strengths).
Copper Soda (summer and winter strengths).
Lime sulphur (summer and winter strengths).
Corrosive Sublimate.
Formalin.
Chlorazone.
Arresto, dusted on.
Sulphur, dusted on.

Two rows of plants and two check rows were apportioned to each test, and the spraying was carried out when the plants were well established and staked.

PLANTING.

Plots were planted in new ground, that is, where tomatoes had never been grown, and also in old ground. The varieties, cultivation, manuring, sterilizing, and spraying were similar in both the new and old ground.

LIMING AND MANURING.

Nitrogenous manures	Stable manure. Dried blood. Nitrate of soda. Bonedust.
Phosphoric acid	Superphosphate. Bonedust.
Lime	Carbonate. Sulphate.

The manures and lime were applied in varying weights on the different plots.

STERILIZING THE SOIL.

Two sections on each plot were sterilized by live steam to ascertain whether soil organisms had any bearing on the disease.

STAKING AND PRUNING.

For spraying purposes staking is essential. Comparisons were made of the yields from pruned and unpruned plants, and from the staked and those not staked.

MARKETING.

The cost of marketing remains the same whatever the price, and it is only profitable to produce good fruit early in the season and by so doing catch the market when prices are at their maximum.

NOTES ON THE EXPERIMENTS.

There was practically no disease in the State last season, so the information gained on the subject of "spotted wilt" was of little or no value.

No conclusions could be drawn from the experiments with the old and new seed or from its treatment. Pickled seed took much longer to germinate, but it rapidly made up the leeway and was more vigorous in growth in both the hot and cold frames.

The "wilt" being practically non-existent, no knowledge was gained regarding the effects of the various sprays on the disease.

Not much information was gained from the manurial tests—these to be of use would require to be carried on for a series of years. It was, however, shown that lime and superphosphate were beneficial in combination. The same may be said of gypsum and superphosphate. On new ground, as was expected, the effects of manuring were more marked than on the old ground. No actual benefit was noticed by the combinations of sulphate of potash and superphosphate or sulphate of potash and bonedust.

The staked plants gave larger yields than the unstaked; this was more noticeable on the new ground.

On the plots sterilized by steam the plants were stronger, healthier, and cropped better. It is a well-known fact that sterilization kills many of the lowly organisms that prey on soil bacteria, and gives the bacteria a chance to flourish more abundantly and produce more plant food.

The number of cases sold amounted to 511, of these 248 brought on the average 8s. 3d. per case, while 263 cases averaged only 2s. 1d. per case, the net return being £114 18s. 4d.

PRELIMINARY MACERATION.

A NEW WINE-MAKING DEVELOPMENT.

F. de Castella, Government Viticulturist.

In Algeria and other warm countries fringing the Mediterranean, a new wine-making method has recently been evolved which seems likely to prove of great value under Northern Victorian vintage conditions, more particularly in an abnormally warm season. It is dealt with at some length in Professor Fabre's recent work on wine-making in Algeria,* from which much of what follows has been adapted.

The innovation is an amplification or extension of "sulphiting" now so familiar in Australian wineries, and which has so transformed wine-making that in normal seasons, at least, there is no longer any excuse for the making of unsound wine. The new method is, in fact, intermediate between ordinary sulphiting and the interesting *Vinerie* method first proposed by M. Barbet about twelve years ago, which has not as yet been applied on a practical scale in Australia.

Briefly, it consists in sulphiting with three or four times the usual dose of SO_2,† with the result that the start of fermentation is delayed for about three days. During this time the skins macerate in the juice, which dissolves from them the colour and extractive substances (tannin, &c.), characteristic of red wine.

In order to make white wine, maceration is, of course, unnecessary. The must is immediately pressed out from the crushed grapes and heavily sulphited; subsequent treatment being much the same as for red wine.

Even in the case of red wine, however, fermentation does not take place in contact with the skins. The vat is filled with crushed and stemmed grapes, sulphited with about four times the usual dose of SO_2 and allowed to remain for three days before pressing, which is

* *Procédés Modernes de Vinification en Algérie et dans les Pays Chauds*, by J. Henri Fabre, Professor of Chemistry and Oenology at Maison-Carrée Agricultural College (Algeria). Published in 1920. In the introduction, by Professor Lagatu, of Montpellier, the new method is commended on account of its suitability to the Algerian climate, similar in many respects to that of northern Victoria.

† SO_2 is a convenient abbreviation for sulphurous acid (anhydrous) or, more correctly, sulphur dioxide, of which it is the chemical formula. It must not be confounded with commercial sulphurous acid, known to the trade as S/ous, which is a solution of sulphur dioxide in water. The maximum strength of this solution at 68°F is 11.5% of SO_2, but that supplied by the trade usually contains about 5%. It soon loses strength, owing to evaporation and oxidation.

When sulphur is burnt in air one part by weight combines with an equal weight of atmospheric oxygen to form two parts of SO_2—which is a gas.

One ounce of SO_2 is provided by :—

(*a*) The combustion of ½ ounce of sulphur :

(*b*) One ounce by weight of sulphur dioxide gas, liquified under pressure ;

(*c*) 2 ounces of so called Bisulphite of Potash (really anhydro-bisulphite $K_2S_2O_5$) or soda Though these salts when pure and freshly prepared contain rather more than 50% SO_2 trade parcels may be looked upon as containing half their weight of SO_2 ;

(*d*) 5 ounces Bisulphite of Soda solution @ 20% ;

(*e*) 20 ounces commercial Sulphurous Acid (S/ous) @ 5%.

carried out prior to, or at the very commencement of, fermentation. The chief departure from the usual method of making red wine lies in the fact that *the extraction of colour, &c., takes place before fermentation, and not during this process.* After three days' maceration the pressed juice is fermented apart from the skins; as the SO_2 gradually disappears, mechanically removed by the ascending bubbles of CO_2* produced by fermentation, the colour, which was temporarily bleached, reappears, and the resulting wine has nearly as much colour and body as that made in the usual way.

It was formerly considered necessary, in order to make a red wine, that fermentation should take place in contact with the skins; the resulting alcohol was held to be the indispensable solvent of the colouring matter. It has since been proved that alcohol is by no means necessary as a colour solvent. The colouring matter contained in the skin of red grapes is, in fact, quite soluble in water. Time alone is needed for solution to take place—in other words, maceration. The very SO_2 which postpones fermentation, assists in the extraction, as it has a considerable solvent action on colour and extractive matter. Though the colour seems at first sight to be bleached and changed, it reappears in all its brilliancy on the disappearance of the SO_2.

Evolution of the New Method.

In order to make this intelligible, we must go back a few years and briefly review the four most important wine-making methods which have, from time to time, been suggested. These are, in chronological order, heat extraction, sulphiting, Barbet's *Vinerie* system, and Semichon's method.

Heat Extraction.

Rosenstiehl,† experimenting in 1897 on the extraction of colour, &c., from grapes by heat, showed that by allowing the marc to macerate in grape juice heated to between 113° F. and 131° F., the red colouring matter was rapidly extracted, thus proving—

"That the colouring matter is dissolved during fermentation, not thanks to the alcohol produced, as was thought and taught, but because the obstacles to its solution disappear under the action of heat or of fermentation. The envelopes which hitherto protected the colouring matter from the solvent action of the juice are broken down during maceration."

Thus was evolved a new method of wine-making by heating, either the must or the crushed grapes, concerning which many articles were contributed to the French viticultural press towards the close of last and the beginning of this century, by such authorities as Rosenstiehl, Kayser, Barba, Semichon, Martinand, &c.

Professor Bioletti, of the University of California, visited some of the chief vine-growing regions of Europe and Algeria in 1904, under the auspices of the University. On his return to California, he published a bulletin‡ in which he summarized the results of his observations. He

* CO_2 is the chemical formula of carbonic acid, the gas liberated during fermentation. According to Lindet, during fermentation, 100 grammes of grape sugar are transformed into—

Carbonic Acid Gas (CO_2)	..	46·67 grammes
Alcohol	..	48·46 ,,
Glycerine	..	3.23 ,,
Succinic Acid ..	..	0·61 ,,
Yeast, &c.	..	1·03 ,,
		100·00 ,,

† *Revue de Viticulture*, 19th June, 1897.

‡ Bulletin No. 167 of the University of California publications, "Manufacture of Dry Wines in Hot Countries."

was much impressed with the new method, which he considered to be the most promising direction in which to look for a means of making good dry wine so as to overcome difficulties owing to climate, &c., of the great central plain of California.

In 1906 he issued Bulletin 177 on "A new method of making dry red wine," giving full practical details of the heat extraction method, including separation of the must, heating of same to 140° to 150° F., maceration on the skins in the extraction vat at about 125° F. for from four to eight hours, pressing, cooling of the pressed juice to 80° F., and its immediate fermentation with a pure yeast apart from the skin. The new process, though successful, does not seem to have altogether fulfilled expectations. In Bulletin 198, issued in 1908, in the portion devoted to improved methods of wine-making, he writes—

"Heat extraction.—The new method of wine-making described in Bulletin 177 has been given a fair trial, and the results on the whole have been satisfactory. It has been demonstrated that a good wholesome wine of remarkable keeping qualities can be made by this means. The colour is deeper and more stable than that of wines made in the usual way, and the control of temperature is much facilitated. In general, it gives greater certainty of obtaining a good and absolutely sound wine than the older methods. Whether the quality of the wine is equal to that of the best wine made by the older methods is still in doubt. It should be remembered, however, that this method is still new, and imperfectly understood. Further tests are needed to demonstrate whether it is capable of producing wines of the highest quality."

"The method has been taken up in practice in a limited way, and so far has given satisfaction. . . ."

"The wines made in this way have shown a tendency to acquire a "Port" taste, which is undesirable in dry wine. This taste, however, may be due to the character of the grapes used more than to the method. None of the red grapes grown in quantity in the San Joaquin Valley are suitable for the production of dry red wine in that region. Any grape which, like the Zinfandel, dries up into raisins on the vine, or easily acquires a "rancio" taste, like Mission or Grenache, is unsuited for the making of dry wine in a hot district."

Though many thousands of gallons of wine were thus made in France, the system did not become general, no doubt owing to the development of the now deservedly popular sulphiting method which came into use about this time.

Sulphiting.

Or, as M. Fabre calls it, "The classic process of wine-making," is now so well known as to scarcely need description. Nevertheless, for the benefit of those not familiar with wine-making, M. Fabre's concise summary of sulphiting as now practised in Algeria may be translated, as follows:

(*a*) "Sulphiting at the rate of 20 grammes of sulphur dioxide (SO_2) per hectolitre, added in two portions of 10 grammes each, one when the grapes are crushed, the other during the course of fermentation."†

(*b*) Contact of the must with the stemmed grapes during fermentation, which lasts, as a rule, three days.

(*c*) Immersion of the "head" (*chapeau*) by rammings given morning and evening.

(*d*) Racking the vat during the course of the third day of fermentation whilst the gravity is still from 1.025 to 1.029 (3.4° to 4° Baumé).

† 20 grammes SO_2 per hectolitre is equivalent to 6.36 ounces bisulphite of potash (50 % SO_2) per 100 gallons.

It will be observed that the total dose of SO_2 recommended by M. Fabre (equivalent to 6·4 oz. of 50 per cent. bisulphite per 100 gallons) is higher than that recommended in articles which have appeared in this *Journal*.*

Dupont and Ventre, and particularly Gimel, recommended the addition of the whole dose of about 4 oz. bisulphite per 100 gallons at the crushing of the grapes.

The standard Algerian method consists in adding a dose nearly equal to that recommended by earlier writers when crushing, and to repeat this dose during the course of fermentation, thus using it as a "chemical cooler." With these differences, and a rather shorter sojourn in the vat, sulphiting as practised in Algeria to-day does not differ from the method recommended by Dupont and Ventre fifteen years ago.

The "Vinerie" System. (*Barbet's*).

This may be regarded as sulphiting carried to its logical conclusion. As soon as the grapes are vintaged and crushed, the juice is sterilized with a sufficient dose of SO_2 to render fermentation impossible. It can then be stored until such a time as suits the wine-maker and fermented at leisure, after the removal of the SO_2 by the operation known as de-sulphiting, under most suitable conditions as regards temperature and cellar care.

This system would naturally lead to the industrialization of wine-making, and put the industry on a similar footing to brewing. It would do away with the hurry and stress which too often interfere with the smooth working of fermentation—always a rather delicate process—during the strenuous vintage season.

The vintage plant is reduced to a sufficiency of cement vats to contain the whole of the juice, some macerating vats for making red wine, and a crushing and pressing plant to extract the juice. The fermentation plant can be on a much more modest scale, as its work continues over a period of many months instead of a few weeks.

At vintage, the grapes are crushed and immediately sterilized by the addition of a dose of SO_2 sufficient to prevent any trace of fermentation, usually at the rate of 125 to 150 grammes of SO_2 per hectolitre of must, equivalent to 40 to 48 oz. bisulphite of potash per 100 gallons, or about ten times the usual dose when sulphiting.†

In order to make white wine, the grapes are pressed immediately and the juice sulphited as above, and stored to await the fermentation process at a convenient time.

For red wine the grapes are crushed and stemmed, sulphited, and allowed to macerate for three or four days on the skins; they are then pressed, and the juice stored until fermented, just as in the case of white wine. During the maceration process the colour and tannin are dissolved from the skins, as explained on p. 37, their extraction is

* See article on Sulphiting in *Journal* for January, 1911 (a reprint of which is obtainable on application). In this article it was stated that according to Dupont and Ventre the most useful dose was from 10 to 15 grms. per hectolitre of SO_2, equivalent to 1·6 to 2·4 oz. SO_2 per 100 gallons, or practically double this dose of potash bisulphite, since this salt usually contains half its weight of SO_2, say 3·2 to 4·8 oz. of bisulphite.

† With such heavy doses the use of bisulphites is undesirable. It is far better to employ sulphur dioxide (SO_2) either produced by the combustion of sulphur or obtainable, compressed to liquid state, in steel cylinders.

greatly facilitated by the high dose of SO_2, the solvent action of which, on these substances, is considerable.

Before fermentation is possible, it is necessary to de-sulphite the juice (red or white), or, in other words, to remove the SO_2 which has prevented fermentation. This is done by passing it through a de-sulphiting apparatus, of which there are several distinct types. One of the most ingenious is that of Barbet, constructed on similar lines to the rectifying column of a still. The must passes through this column at reduced pressure (partial vacuum), and at a temperature of about 70° C. (158° F.). There are several other types of de-sulphiting machines, notably those of M. Bonnard (of Alger), and Sicard (of Cette (South France). In these, the removal of the SO_2 is effected by evaporation, in shallow depth, at a temperature of 122° F. to 140° F.

In addition to fermentation without stress or hurry, the Vinerie method presents several other advantages. During storage of the sulphited musts, sedimentation takes place, removing dirt and undesirable pectic substances. The must, when ready for fermentation, is thoroughly sterile, and lends itself admirably to the use of cultivated yeasts. The resulting wine has thus every chance of being not only absolutely sound and free from disease, but very clean, delicate, and of excellent condition and keeping quality.

Notwithstanding these obvious advantages, the method has not displaced the usual or classic method of wine-making, as was expected at its introduction in Algeria, M. Fabre states that the Misserghin Vinerie, established near Oran, Algeria, in 1910, only operated for a few months. Another vinerie seems to have been built last year at Sidi-Bel-Abbès (Algeria), and some similar establishments are working in Greece and in Italy.

The chief reason for the slow progress of the new method seems to be the high cost of the plant and difficulty in the proper working of the somewhat complex de-sulphiting apparatus.

This very short description of the Vinerie system is necessary in order to properly explain the newer method which forms the subject of the present article.

Semichon's Method.

In 1909, M. L. Semichon proposed to radically transform the making of red wine by a method differing considerably from that of Rosenstiehl and also from that of Barbet, by the postponement of maceration until after fermentation.

As soon as the grapes are crushed the juice is separated (mainly by draining) and fermented apart from the skins, as a white or slightly coloured wine, which is subsequently macerated (after fermentation) on freshly crushed and drained skins from which it dissolves colour and other extractive substances. Maceration is not, however, carried out on the grapes from which the wine was originally extracted, but on the drained skins from a later crushing.

Semichon, in fact, recommends to commence the vintage with white or other light-coloured grapes, and to postpone the vintaging of the red grapes, on which the white wine, first made, will macerate, until fermentation is sufficiently advanced (four or five days). In other

words, the wine does not macerate on its own skins but on those of grapes vintaged a few days later.

It is not here necessary to go into the details of the process and the working of the different series of vats which are divided into two main groups, viz., maceration (and drainage) batteries, and fermentation batteries.

From the latter the wine flows continuously through the former until the colour, &c., has been sufficiently extracted, when the skins are either pressed, or separated from the wine they retain by diffusion.

Though somewhat complicated, the manipulations, once properly under way, should work smoothly enough.

Semichon claimed several advantages for his method over Barbet's *Vineries,* one of the principal being the more complete extraction of the flavouring substances of the grape, several of which are, in his opinion, mainly dissolved by the alcohol produced during fermentation. A lengthy and interesting controversy ensued between these two authorities in the columns of *La Revue de Viticulture,* in 1909.

Notwithstanding the high standing of its inventor in œnological science, Semichon's method does not seem to have been applied on a large scale. It is not even mentioned in recent works on wine-making.

Maceration and Fermentation Not Necessarily Simultaneous.

From the foregoing it will be seen that the making of red wine comprises two quite distinct processes, viz., fermentation, or the conversion of the grape sugar into alcohol; and maceration, or the dissolving from the skins, of the colour, tannin, and some other substances to which red wine owes its peculiar character.

Contrary to what is often thought, these two processes are quite distinct, and are not necessarily connected in any way.

Maceration may take place before, during, or after fermentation.

In the time-honoured way of making red wine, the two are simultaneous—nor has ordinary sulphiting altered this order of things.

In Barbet's *Vineries* there is, however, a very radical departure, maceration taking place before fermentation, which is held over until a convenient season, which may be weeks, or even months, later. The new Algerian method, likewise, makes maceration precede fermentation, but by the short period of three days only.

In Semichon's ingenious method, on the contrary, fermentation precedes maceration, the wine being fermented apart from the skins just as white wine is, and in it, the skins (usually a fresh lot) are macerated later on.

Preliminary Maceration.

This new method is really a modification of Barbet's *Vineries,* by considerably reducing the dose of SO_2 and completely eliminating the desulphiting apparatus. Instead of ten times the usual dose of SO_2 as needed by the Vinerie system, four times the normal dose suffices in the case of preliminary maceration. According to M. Fabre:—

"Empirically, sometimes perhaps accidentally, wine-makers in warm Mediterranean countries have found that it is possible to obtain most of the advantages

claimed by M. Barbet, in favour of his *Vineries*, not by using 100 grammes or more of SO_2 per hectolitre (which stops fermentation too effectually), but by using quantities very superior to those usually laid down in classic wine-making (10 to 20 grammes)."

. . . "The new process consists in treating the crushed grapes with a dose of SO_2 sufficient to stop fermentation for about three days."

"This check permits the realization of the maceration phenomena recommended by M. Barbet, and which consist in the dissolving of the colouring matter of the skins and of various extractive principles, by the musts destined to become red wines." . . .

"As a rule, in our tests, with not more than 40 grammes of SO_2 per hectolitre (12.8 oz. bisulphite per 100 gallons), fermentation was only able to establish itself in the *maceration vats*, towards the third day, making a timid beginning in the upper part of the liquid. We then rack the first run, which is still cool (in reality at the cellar temperature, which is about 77° F.), and immediately press the mare."

"The juice from the press, which is already commencing to ferment, is mixed with the first run, and pumped into the fermentation *amphoræ* (cement vats), where the transformation takes place with great security; no alarming rise of temperature occurs, and as there is no "head" (*chapeau*) of mare, there is no need to pump over the vat (from bottom to top)."

It is recommended, not to allow the fermentation to complete itself in the *fermentation amphoræ*, or vats, which would take several days (the original gravity of the must was about 12° Baumé), but to pump them into finishing vats (*amphores d'achèvement*), where the fermentation concludes in perfect order. M. Fabre's experiments were certainly on a very large scale. In the co-operative cellars of Gouraya and of Duploix he operated on several hundred thousand gallons. He sums up the advantages and defects of the new method as follows:—

Advantages (much the same as those claimed by M. Barbet for his *Vineries*):—

1. Purification of the musts operated on, from a micro-organism stand-point.
2. The musts having time to cool during the three days' maceration, fermentation starts at a relatively low temperature—approximately that of the interior of the cellar (about 77° F.).
3. There being no "head" in the fermenting vat, there is no risk of acetification, nor is there any need to pump from bottom to top during fermentation.
4. This method requires no special plant. It is, in fact, more easy to conduct than the *classic method*, particularly in hot weather.

Drawbacks:—

1. The wines are appreciably less deeply coloured than those obtained by the classic method.*
2. They contain a little less dry extract and body.
3. They must be racked several times to facilitate the liberation of SO_2 which they contain.

* It is true that Barbet claims increased colour for his *vinerie* wines, owing to the solvent action of the heavy dose of SO_2. M. Fabre does not contradict this, and merely notes that with the dose he used the colour was less deep. He points out that this could be obviated by allowing the fermentation, just about to start, to continue for a few hours before racking and pressing, though this would constitute a partial return to the "classic method"—it could no longer be strictly termed preliminary maceration.

M. Fabre submitted samples of wines made by the new and the old methods to a committee of expert wine-tasters, who reported as follows:—

1. The samples tasted are excellent; but they would have gained in colour and flavour had their total acidity been slightly increased.
2. The wines obtained by the classic method seem more complete and richer in colour, but show less refinement (*moins fins*) than the wine made by preliminary maceration.
3. From a commercial stand-point, the wines made by the classic method are more in current demand, because they show more colour and body (qualities sought by the trade for blending wines).
4. On account of its refined character, the wine made by preliminary maceration is worthy of being reserved for sale to *la clientèle bourgeoise.** According to M. Lung (one of the tasting committee), "This class of wine is in strong demand by a well-informed class of customers, whose numbers are bound to increase."

Continuous Fermentation.

The new method lends itself to the practical application, in wine-making, of the process, well known in industrial distilleries, under the name of continuous fermentation.

This would consist in replenishing the fermenting vat, either continuously or else twice a day, with cold sulphited must; a corresponding bulk of the partially fermented wine having been previously withdrawn, the specific gravity of which would be about 1.020 (nearly 3° Baumé—2.8° B. to be accurate), the portions thus withdrawn completing their fermentation in special "finishing" vats.

Though M. Fabre does not consider this procedure indispensable, he agrees with M. Barbet, who recommends its application as being most favorable to temperature control in the fermenting vat. He quotes a letter, dated 26th December, 1919, from a Greek correspondent (Société Hellénique de Vins et Spiritueux) who applied the method during several vintages, and who states: "The de-sulphiting of musts containing up to 1 gramme of sulphurous acid (SO_2) per litre† does not necessitate the use of special apparatus provided starters (*Pieds de Cuve*) are moderately and continuously replenished (with cold sulphited must) in such a way that the fermenting mass remains at the constant gravity of 5° to 6° Baumé."

In the absence of practical working details, the following outline will give an idea of how the process might be applied to, say, a 1,000-gallon vat.

The vat might commence with a starter of 400 gallons of moderately sulphited must (2 oz. SO_2 per 100 gallons) of an original gravity when crushed of 12° Baumé. As soon as the gravity has reduced by fermentation to 5° B., enough of the heavily sulphited cold must (also at 12° B.) is run in, to raise the gravity to 6° B. This would need the

* The term *Clientèle bourgeoise* is not easy to concisely translate. Middle-class customers is perhaps the nearest English equivalent. This class, in France at any rate, appreciates quality. It wants its *vin ordinaire* to be of rather higher grade than would satisfy the ordinary French labourer.

† This would mean 16 oz. SO_2 per 100 gallons, practically equivalent to 32 oz. (of 50% SO_2) bisulphite per 100 gallons.

addition of about one-sixth of the bulk in the vat, or 66 gallons of cold sulphited must.

After a few hours, when the gravity has again fallen to 5° B., a fresh addition of cold sulphited must is made, and so on until the vat is full.

After this, the process becomes continuous; every few hours, when the gravity of the vat registers 5°, one-sixth of its contents is withdrawn and replaced by an equal bulk of cold, sulphited must, the portions withdrawn being pumped into a finishing vat or into casks to complete fermentation slowly and without danger of an alarming rise in temperature.

The exact gravity at which withdrawals can most advantageously be made, their bulk and their frequency, would, no doubt, depend a good deal on the class of wine turned out. These would, in all probability, be different in the case of a wine of *Vin ordinaire* type, containing 16 or 17 per cent. proof spirit, to what they would be for an "export" wine containing 24 per cent. proof.

It is evident that this process is really applicable only in wineries turning out large quantities of wine of perfectly even type, as is the usual rule in Algeria. It is much less suited to Australian conditions, where many quite distinct wines are usually produced in the same cellar.

* * * * * * *

The foregoing is a brief description of the new method of wine-making. It does not seem destined to supersede the method by which the majority of Victorian wines are now made—which is practically the same as the "classic" Algerian method—in ordinary seasons, and more particularly for the making of export wines, in which colour and body are eagerly sought after.

Nevertheless, it presents certain advantages which will render it of inestimable value during an abnormally hot vintage. Practical wine-makers know, only too well, the disastrous effects of a heat wave occurring during vintage, and the large quantities of faulty wines such a visitation may be responsible for.

Heat waves are most likely to occur early in the vintage, since the weather becomes cooler later on. This early occurrence is particularly undesirable since it may lead to bacterial contamination of the winery and loss of quality in wines made later, when conditions have again become normal.

Mishaps of this kind would be altogether avoided by the adoption of the preliminary-maceration process, if only during the currency of the heat wave. Though the wines then made might be somewhat light in colour and body, they would at least be sound, and bacterial contamination of the cellar would be obviated.

For the making of light dry table wines more particularly, it also shows great promise. If we ever become a wine-drinking people, as are the Latin countries of Europe, an active demand for light table wines at a reasonable price will surely develop—in other words, the *clientèle bourgeoise* mentioned by M. Lung. For such a trade, owing to the greater delicacy of the wine, the new method should prove of very considerable value.

For these two reasons, principally, the writer considers it his duty to bring this interesting Algerian development under the notice of Victorian wine-makers, in time for the coming vintage.

ARTIFICIAL FERTILIZERS.

List of Fertilizers Registered under the Fertilizers Act for the Year 1922.

By P. Rankin Scott, Chemist for Agriculture.

REGISTRATION OF BRANDS.

The Artificial Fertilizers Act requires that all manufacturers and importers of fertilizers submit for registration on or before the 1st November, in each year, a brand for each fertilizer they intend offering for sale during the following year.

In addition to his full name and place of business, and the figure, trade mark or sign, to be associated with the fertilizer to identify it, each applicant is required to give a statement of the percentage composition of the fertilizer for which registration is desired, in respect of its nitrogen, phosphoric acid, and potash, showing the forms in which they occur, and the retail price of the fertilizer. The term "form" has reference to the combination of the fertilizing constituent with other constituents, the availability of the fertilizer largely depending on the combination of the elements composing it. A fertilizer, according to the Act, is any material containing nitrogen, phosphoric acid, or potash, which has been manufactured, produced or prepared in any manner for the purpose of fertilizing the soil or supplying nutriment to the plant.

The list of registered brands that have been accepted is to be found on pages 47-54 of this issue.

TABLE OF UNIT VALUES.

The unit values are calculated each year from the brands of the simple fertilizers registered. These values afford a basis for calculating the commercial values of all fertilizers for the period during which the brands continue in force, serving, also, the buyer by affording a means of comparing the prices of all registered brands. It may be pointed out, however, that in the case of a mixed fertilizer no allowance is made for extra cost of handling and mixing, incurred by the manufacturer. To obtain the commercial value of a fertilizer multiply the percentage of nitrogen, phosphoric acid, or potash, as stated on the label or invoice certificate, by the unit value fixed for the form in which it occurs in the fertilizer, and add together the results.

The following typical examples will explain the method of calculation:—

(1) SUPERPHOSPHATE.

Analysis.		Unit Value.					
		s.	*d.*		£	*s.*	*d.*
Phosphoric Acid, Water Soluble...	17.00%	× 7	0	=	5	19	0
Phosphoric Acid, Citrate Soluble	0.50%	× 6	0	=	0	3	0
Phosphoric Acid, Citrate Insoluble	0.50%	× 1	0	=	0	0	6
Phosphoric Acid—Total ...	18.00%						
Calculated value per ton ...				....	£6	2	6

(2) BONEDUST.

	Analysis.
Nitrogen, as bone	3.60%
Phosphoric Acid	18.00%
	Mechanical Condition.
Fine Bone	37.0%
Coarse Bone	63.0%

Nitrogen	...	3.60%	× 37.0%	in fine bone =	1.32%
Nitrogen	...	3.60%	× 63.0%	in coarse bone =	2.28%
Phosphoric Acid	...	18.00%	× 37.0%	in fine bone =	6.66%
Phosphoric Acid	...	18.00%	× 63.0%	in coarse bone =	11.34%

					s.	d.		£	s.	d.
Nitrogen in fine bone	...	1.32%	×	25	0	...	1	13	0
Nitrogen in coarse bone	...	2.28%	×	23	0	...	2	12	6
Phosphoric Acid in fine bone		6.66%	×	6	0	...	1	19	11
Phosphoric Acid in coarse bone		11.34%	×	4	0	...	2	5	4
Calculated value per ton...						...	£8	10	9

FERTILIZER ACT 1915 (No. 2652).—TABLE OF UNIT VALUES FOR 1922.

	Per unit. £	s.	d.
Nitrogen, as Nitrate	1	12	4
„ Ammonia	1	1	0
„ Blood	1	7	0
„ Bone and Flesh	1	5	0
„ Unspecified	1	5	0
„ in Fine Bone	1	5	0
„ Coarse Bone	1	3	0
Phosphoric Acid, as Water Soluble	0	7	0
„ „ Citrate Soluble	0	6	0
„ „ Citrate Insoluble, in Superphosphates	0	1	0
„ „ „ „ in Nitro-supers	0	1	0
„ „ „ „ Basic Phosphates	0	1	0
„ „ „ „ Market Garden Manure	0	1	0
„ „ „ „ Complete Manures	0	1	0
„ „ „ „ Super and Bone	0	4	0
„ „ „ „ Bone Fertilizers	0	4	0
„ „ „ „ Animal Fertilizers	0	4	0
„ „ „ „ Blood and Bone	0	4	0
„ „ „ „ Intensely ground Phosphate ..	0	4	0
„ „ „ „ Roasted and intensely ground Phosphates	0	5	10
„ „ in Fine Bone	0	6	0
„ „ Coarse Bone	0	4	0
Potash	0	10	4

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922.

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen—Readily Soluble.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Nitrate of Soda ..	Federal	15·50	..	..	..	..	15·50	..	..	..	..	..	25 0 0	The Australian Explosives and Chemical Coy. Ltd., 135 William-street, Melbourne
,, ,, ..	M.L., in diamond ..	15·50	..	..	..	..	15·50	..	..	..	..	..	25 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ,, ..	Sickle	15·50	..	..	..	..	15·50	..	..	..	..	..	25 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	15·50	..	..	..	..	15·50	..	..	..	..	..	25 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Sulphate of Ammonia ..	Federal	..	20·00	..	..	..	20·00	..	..	..	..	..	20 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ,, ..	M.L., in diamond ..	..	20·00	..	..	..	20·00	..	..	..	..	..	20 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ,, ..	Sickle	..	20·00	..	..	..	20·00	..	..	..	..	..	20 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	..	20·00	..	..	..	20·00	..	..	..	..	..	20 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
,, ,, ..	M.G. Co.	..	20·59	..	..	..	20·59	..	..	..	..	..	18 0 0	The Metropolitan Gas Co., 196 Flinders-street, Melbourne
,, ,, ..	B.G. Co.	..	20·90	..	..	..	20·90	..	..	..	..	..	18 0 0	The Ballarat Gas Co., Grenville-street, Ballarat
Containing Nitrogen—Moderately Soluble.														
Castor, Meal	Federal	..	..	..	..	4·00	4·00	..	..	..	..	..	5 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ...	M.L., in diamond ..	..	..	..	..	4·00	4·00	..	..	..	..	..	5 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Phosphoric Acid —Difficultly Soluble.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Castor, Meal	Sickle	..	..	..	..	4·00	4·00	..	..	....	..		5 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ...	Wischer and Co. Pty. Ltd.	..	..	..	..	4·00	4·00	..	..	..	..	..	5 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Dried Blood	Rohs, in circle ..	..	..	9·50	..	..	9·50	..	..	..	..	..	14 0 0	P. Rohs Pty. Ltd., Bendigo East
,, ...	Champion ..	..	..	12·00	..	..	12·00	..	..	..	..	..	Not retailed	John Cooke and Co. Pty. Ltd., 534 Collins-street, Melbourne
Blood Manure	M.C.C., in diamond	..	..	8·95	..	..	..	..	..	1·46	1·46	0·65	9 0 0	
Dried Blood	Arch	..	..	10·77	..	..	..	..	..	1·71	1·71	..	12 0 0	The Ballarat and District Co-operative Freezing Co. Ltd., Learmonth-street, Alfredton
,, ...	P., in diamond ..	..	..	9·00	..	..	..	..	..	0·50	0·50	..	15 10 0	H. C. Pannifex, 26 Market-street, Melbourne
Blood Manure	Pan, in diamond ..	..	..	7·00	..	..	..	..	..	0·25	0·25	..	11 11 0	H. C. Pannifex, 26 Market-street, Melbourne
Dried Blood	S.C., over D.B. ..	..	..	10·00	..	..	..	..	..	1·50	1·50	..	14 15 0	Sims, Cooper and Co., Aust., Pty. Ltd., Collins-street, Melbourne
Containing Potash—Readily Soluble.														
Muriate of Potash ..	Federal	..	..	..	..	..	..	..	..	..	..	58·00	30 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, . ,, ..	M.L., in diamond ..	..	..	..	..	..	..	..	..	..	..	58·00	30 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ...	Sickle	..	..	..	..	..	..	..	..	..	..	58·00	30 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	..	..	..	..	..	..	..	..	..	..	58·00	30 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Containing Phosphoric Acid—Readily Soluble.														
Superphosphate ..	Federal, O.S. ..	..	..	..	..	..	..	17·00	0·50	0·50	18·0	..	6 3 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ..	M.L., in diamond ..	..	..	..	..	..	..	17·00	0·50	0·50	18·00	..	6 3 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ..	Sickle, Florida ..	..	..	..	..	..	..	17.00	0·50	0·50	18·00	..	6 3 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ..	Wischer and Co. Pty. Ltd., No. 1	..	..	..	..	..	..	17·00	0·50	0·50	18·00	..	6 3 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Moderately Soluble.														
Basic Phosphate ..	Federal, B.P. ..	..	..	..	..	..	..	..	14·00	3·00	17·00	..	5 12 6	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ..	M.L., in diamond ..	..	..	..	..	..	..	..	14·00	3·00	17·00	..	5 12 6	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ..	Sickle	..	..	..	..	..	..	..	14·00	3·00	17·00	..	5 12 6	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ..	Wischer and Co. Pty. Ltd.	..	..	..	..	..	..	..	14·00	3·00	17·00	..	5 12 6	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Difficultly Soluble.														
Ground Phosphate ..	Federal, G.P. ..	..	..	..	..	..	..	..	..	36·50	36·50	..	6 0 0	The Australian Expolsives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ..	M.L., in diamond, 80 per cent.	..	..	..	..	..	..	..	..	36·50	36·50	..	6 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little street, Melbourne
,, ..	M.L., in diamond, 60 per cent.	..	..	..	..	..	..	..	..	27·50	27·50	..	5 0 0	,, ,, ,, ,,
,, ..	M.L., in diamond, 50 per cent.	..	..	..	..	..	..	..	..	23·00	23·00	..	4 7 6	,, ,, ,, ,,

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued*.

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.		£ s. d.	
Containing Phosphoric Acid—Difficultly Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%		
Ground Phosphate ..	Sickle, 80 per cent.	..	..	..	..	..	..	..	..	36·50	36·50	..	6 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ..	Sickle, 60 per cent.	..	..	..	..	..	..	..	..	27·50	27·50	..	5 0 0	,, ,, ,, ,,
,, ..	Sickle, 50 per cent.	..	..	..	..	..	..	..	..	23·00	23·00	..	4 7 6	,, ,, ,, ,,
,, ..	Wischer and Co. Pty. Ltd., 80 per cent.	..	..	..	..	..	..	..	..	36·50	36·50	..	6 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
,, ..	Wischer and Co. Pty. Ltd., 60 per cent.	..	..	..	..	..	..	..	..	27·50	27·50	..	5 0 0	,, ,, ,,
,, ..	Wischer and Co. Pty. Ltd., 50 per cent.	..	..	..	..	..	..	..	..	23·00	23·00	..	4 7 6	,, ,, ,,
,, ..	Victoria—Roasted and intensely ground	..	..	..	..	..	..	..	3·00	12·00	15·00	..	4 8 6	The Phosphate Co-operative Co. of Australia Ltd., 440 Little Collins-street, Melbourne
,, ..	Victoria—No. 3, intensely ground	..	..	..	..	..	..	..	..	14·00	14·00	..	2 16 0	,, ,, ,,
,, ..	Victoria — No. 4, coarsely ground	..	..	..	..	..	..	..	..	11·00	11·00	..	2 5 0	,, ,, ,,
,, ..	Marion, 60 per cent.	..	..	..	..	..	..	..	..	27·50	27·50	..	5 10 0	Arthur H. Hasell, 17 Queen-street, Melbourne
Containing Nitrogen and Phosphoric Acid—Readily Soluble.														
Nitro-Super	Federal, N.S. ..	..	1.50	..	0.50	..	2.00	13.18	0.38	1.71	15.27	.	8 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ...	M.L., in diamond ..	..	1.50	..	0.50	..	2.00	13.00	0.38	1.37	14.75	..	8 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ...	Sickle	..	1.50	..	0.50	..	2.00	13.00	0.39	1.61	15.00	..	8 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ...	Wischer and Co. Pty. Ltd.	..	1.50	..	0.50	..	2.00	13.00	0.39	1.61	15.00	..	8 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen and Phosphoric Acid—Readily Soluble—continued.		%	%	%	%	%	%	%	%	%	%		£ s. d.	
Nitro-Super	Federal, T.D. ..	1.55	..	..	..	..	1.55	15.30	0.45	0.45	16.20	..	7 10 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ...	M.L., in diamond, No. 2	1.55	..	..	..	..	1.55	15.30	0.45	0.45	16.20	..	7 10 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ...	Sickle, T.D. ..	1.55	..	..	..	..	1.55	15.30	0.45	0.45	16.20	..	7 10 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
Top dressing Manure ..	Wischer and Co. Pty. Ltd.	1.55	..	..	..	..	1.55	15.30	0.45	0.45	16.20	..	7 10 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Moderately Soluble.														
Super and Bone ..	Federal, B.S. ..	..	..	..	0.75	..	0.75	12.75	1.13	3.62	17.50	..	7 7 6	The Australain Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ..	M.L., in diamond ..	..	..	..	0.75	..	0.75	12.75	1.38	3.37	17.50	..	7 7 6	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ..	Sickle	..	..	..	0.75	..	0.75	12.75	1.37	3.38	17.50	..	7 7 6	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ..	Wischer and Co. Pty. Ltd.	..	..	..	0.75	..	0.75	12.75	1.37	3.38	17.50	..	7 7 6	Wischart and Co. Pty. Ltd., 153 William-street, Melbourne
Bonedust and Superphosphate, mixed	Rohs, in circle ..	..	..	..	1.50	..	1.50	8.50	5.25	4.25	18.00	..	9 0 0	P. Rohs Pty. Ltd., Bridge-street, Bendigo
Blood, Bone and Super., mixed	Rohs, in circle ..	..	..	..	4.00	..	4.00	5.50	6.25	2.25	14.00	..	10 10 0	,, ,, ,,
Bone and Superphosphate	Gardiner's	..	..	..	1.39	..	1.39	3.20	5.80	8.00	17.00	..	8 12 6	George Gardiner and Co. Pty. Ltd., Marshall, Geelong
,, ,, ..	Elsworth's Fertilizer	..	..	..	3.00	..	3.00	1.50	4.00	9.50	15.00	..	8 10 0	William Roberts Elsworth, corner of York and Joseph streets, Ballarat
,, ,, ..	Elsworth's Bone Fertilizer and Super.	..	..	..	1.50	..	1.50	9.00	2.50	5.00	16.50	..	7 12 6	,, ,, ,,

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Containing Nitrogen and Phosphoric Acid—Moderately Soluble—continued.		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Bone and Blood ..	Arch	..	..	..	5.00	..	5.00	..	3.50	9.00	12.50	..	9 0 0	Ballarat and District Co-operative Freezing Co. Ltd., Learmonth-street, Alfredton, Ballarat
Animal Fertilizer ..	Champion ..	..	..	..	6.00	..	6.00	..	7.50	4.50	12.00	..	Not retailed	John Cooke and Co. Pty. Ltd., 534 Collins-street, Melbourne
Blood and Bonedust ..	Rohs, in circle ..	..	..	..	6.00	..	6.00	..	3.00	6.00	9.00	..	12 10 0	P. Rohs Pty. Ltd., Bridge-street, Bendigo
Blood and Bone ..	S.C. over B.B. ..	..	..	..	5.50	..	5.50	..	6.00	11.00	17.00	..	12 0 0	Sims, Cooper and Co. (Aust.), Pty. Ltd., The Olderfleet, Collins-street, Melbourne
Animal Fertilizer ..	Fertbone, in circle ..	..	..	..	4.00	..	4.00	..	2.00	8.00	10.00	..	12 12 6	H. C. Pannifex, 26 Market-street, Melbourne
,, ,, ..	H.C.P., in diamond..	..	..	..	5.00	..	5.00	..	4.75	5.25	10.00	..	12 17 6	,, ,, ,,
,, ,, ..	Gardiner's Special Magic	..	..	..	5.00	..	5.00	..	3.00	10.00	13.00	..	19 0 0	George Gardiner and Co. Pty. Ltd., Marshall, Geelong
Containing Nitrogen, Phosphoric Acid and Potash—Readily Soluble.														
Market Garden Manure	Federal, M.G. ..	..	1.50	..	0.56	0.90	2.96	9.77	0.29	1.87	11.93	2.17	9 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ,, ..	M.L., in diamond ..	..	1.50	..	0.56	0.90	2.96	9.77	0.29	1.87	11.93	2.17	9 0 0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ,, ..	Sickle	..	1.50	..	0.56	0.90	2.96	9.77	0.29	1.87	11.93	2.17	9 0 0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	..	1.50	..	0.56	0.90	2.96	9.77	0.29	1.87	11.93	2.17	9 0 0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
No. 1 Complete Manure ..	Federal	..	1.50	..	..	1.00	2.50	10.20	0.30	0.30	10.80	7.25	11 0 0	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash.	Price asked per ton.			Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Unspecified.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.		£	s.	d.	
Containing Nitrogen, Phosphoric Acid, and Potash—Readily Soluble—contd.		%	%	%	%	%	%	%	%	%	%	%				
No. 1 Complete Manure ..	M.L., in diamond ..	..	1.50	..	..	1.00	2.50	10.20	0.30	0.30	10.80	7.25	11	0	0	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ,, ..	Sickle	..	1.50	..	..	1.00	2.50	10.20	0.30	0.30	10.80	7.25	11	0	0	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	..	1.50	..	..	1.00	2.50	10.20	0.30	0.30	10.80	7.25	11	0	0	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
No. 2 Complete Manure ..	Federal	..	1.00	..	..	1.00	2.00	10.20	0.30	0.30	10.80	4.64	8	17	6	The Australian Explosives and Chemical Co. Ltd., 135 William-street, Melbourne
,, ,, ..	M.L., in diamond ..	..	1.00	..	..	1.00	2.00	10.20	0.30	0.30	10.80	4.64	8	17	6	The Mount Lyell Mining and Railway Co. Ltd., 381 Little Collins-street, Melbourne
,, ,, ..	Sickle	..	1.00	..	..	1.00	2.00	10.20	0.30	0.30	10.80	4.64	8	17	6	Cuming, Smith and Co. Pty. Ltd., 65 William-street, Melbourne
,, ,, ..	Wischer and Co. Pty. Ltd.	..	1.00	..	..	1.00	2.00	10.20	0.30	0.30	10.80	4.64	8	17	6	Wischer and Co. Pty. Ltd., 153 William-street, Melbourne
Containing Nitrogen and Phosphoric Acid—Moderately Soluble.																
Bone Fertilizer ..	Samson's	..	..	..	2.00	..	2.00	..	2.00	15.00	17.00	..	8	5	0	George Gardiner and Co. Pty. Ltd., Marshall, Geelong
,, ..	No. 1 Magic ..	..	..	..	2.00	..	2.00	..	2.00	15.00	17.00	..	8	5	0	,, ,, ,,
,, ..	No. 2 Magic ..	..	..	..	1.50	..	1.50	..	1.50	14.50	16.00	..	7	17	6	,, ,, ,,
,, ..	Ark	..	..	..	3.16	..	3.16	..	3.66	15.60	19.26	..	7	10	0	Arthur Murphy, Ararat
,, ..	Horse Shoe ..	..	..	..	3.50	..	3.50	..	4.70	10.70	15.40	..	8	10	0	Patrick Fitzgerald and Sons, Warragul-road, Bentleigh
Animal Fertilizer ..	A.N.A. Surprise ..	..	..	..	3.00	..	3.00	..	4.00	12.00	16.00	..	10	0	0	George W. Pennell, Braybrook
Bone Fertilizer ..	Bailey Bros. ..	..	..	..	2.50	..	2.50	..	6.50	9.50	16.00	..	8	0	0	Bailey Bros., 155 Main-street, Ballarat East

LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1922—*continued.*

Description of Fertilizer.	Brand.	Nitrogen as Bone.	Phosphoric Acid.	Mechanical Condition.		Price asked per ton.	Where Obtainable.
				Fine Bone.	Coarse Bone.		
		%	%	%	%	£ s. d.	
Bonedust	Vauxhall	3.86	23.25	33.70	66.30	9 0 0	William Moore, Panmure
,, ...	Rohs, in circle ..	4.00	18.00	55.00	45.00	10 10 0	P. Rohs Pty. Ltd., Bridge-street, Bendigo
,, ...	White Horse ..	2.50	17.00	60.00	40.00	7 10 0	F. W. Richards, Warrenheip
,, ...	Mt. Clear ..	3.00	18.00	30.00	70.00	8 10 0	Bailey Bros., 155 Main-street, Ballarat East

P. RANKIN SCOTT,
Chemist for Agriculture.

Melbourne, 30th November, 1921.

STALLIONS REGISTERED FOR 1921-22

under the Horse Breeding Act.

(Part III.—Registrations after 16th September, 1921.*)

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1199	Abbotsford Champion	A	Draught ..	C. Elphick ..	Woorarree West
1265	Abbot's Pride ..	A	,, ..	M. McLeod ..	Condah Swamp
1227	Ace of Spades ..	A	Light ..	C. Lippiatt ..	Scotsburn
1200	Agitation	A	Draught ..	J. Ball ..	Werribee
1053	Agitator's Heir ..	A	,, ..	G. R. Aurisch ..	Harkaway
1296	Aird Laddie ..	A	,, ..	E. Yeaman ..	Echuca
1072	Albert Dale ..	3	,, ..	Vaughan Bros. ..	Melbourne
1079	All Tricks	6	Light ..	Mrs. J. C. Millard	Condah
1167	Almont M. ..	A	,, ..	J. Minns ..	Melton
1254	Almost	A	,, ..	D. Lang ..	Tungamah
1278	Amanus	A	Thoroughbred	A. and J. H. Young	Blackheath
1065	Anchorite II. ..	A	Pony ..	J. Rousch ..	Cohuna
1344	Ashville Lad ..	A	Light ..	G. Inglis ..	Tallygaroopna
1256	Astor	A	,, ..	A. Grant ..	Meredith
1092	Attraction's Champion	A	Draught ..	D. Morley ..	Rutherglen
1336	Badaween ..	A	Light ..	B. Folliott-Sandford	Lysterfield
1242	Banker Again ..	2	Draught ..	W. H. Penno ..	Boort
1113	Barney	A	,, ..	L. W. Hyland ..	Benalla
1272	Baron Alexander ..	A	,, ..	Miller Bros. ..	Bacchus Marsh
1274	Baron Alexander ..	6	,, ..	A. F. Russell ..	Barunah Plains
1201	Baron Brilliant ..	A	,, ..	Wyatt Bros. ..	Rainbow
1118	Baron Bute ..	A	,, ..	W. Black ..	Coldstream
1160	Baron Clyde ..	A	,, ..	Cunnington Bros.	Bamawm
1059	Baron Crawford ..	A	,, ..	L. J King ..	Quambatook
1056	Baron Crombie ..	4	,, ..	A. P. Johnston ..	Colbinabbin
1134	Baron Gleniffer ..	A	,, ..	S. J. Lynn ..	Orbost
1052	Baron Jock ..	3	,, ..	M. Lynch ..	Hopetoun
1080	,, Lough ..	A	,, ..	S Coombs ..	Numurkah
1066	,, Primrose ..	3	,, ..	J. Egan and Sons	Ballan
1003	,, Rosebery ..	4	,, ..	W. Allen ..	Junortown
1290	,, Weerite ..	5	,, ..	Manifold and Co.	Purrumbete
1279	Bay Harold ..	A	Light ..	A. Sutherland ..	Oakleigh
1091	Beaconsfield Flyer ..	A	,, ..	W. A. Syme ..	Eldorado
1228	Beau Gallant ..	A	,, ..	J. Dunlop ..	Birregurra
1006	Ben Kell Major Dale	3	Draught ..	G. Stewart ..	Jerilderie, N.S.W.
1133	Ben Marceline ..	A	Light ..	F. A. Cox ..	Geelong
1164	Black Shepherd ..	3	Draught ..	G. Simpson ..	Tongala
1275	,, Voyage ..	2	Light ..	J. Penno ..	Minmindie
1268	Blackwin ..	5	,, ..	H. W. Grattan ..	Kew
1260	Bleriot	A	,, ..	D. Mitchell and Sons	Staghorn
1099	Bobby	5	Pony ..	G. Officer ..	Woolthorpe
1129	Bold Lad	A	,, ..	J. W. Smith ..	Elmore
1243	,, McGregor ..	2	Draught ..	W. H. Penno ..	Boort
1188	,, Newton ..	5	,, ..	Hehr Bros. ..	Woolert

* For registrations prior to 16th September, 1921, see *Journals* for October and November, 1921.

STALLIONS REGISTERED FOR 1921–22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1343	Bold Newton ..	A	Draught ..	J. R. Mitchell ..	Sandford
1300	Bonnie Direct ..	A	Light ..	W. T. Taylor ..	Merbein South
1339	Bramhope Royal William	A	Draught ..	G. Wilson ..	Talgarno
1266	Breedon Pioneer ..	A	,, ..	M. C. Ryan ..	Chetwynd
1116	Bright Bells ..	5	Light ..	S. R. Ritchie ..	Thomastown
1082	British Admiral ..	A	Draught ..	T. McMenemin ..	Maldon
1236	Bronte's Pride ..	5	Pony ..	W. A. Jones ..	Dumosa
1259	Bronze Cleve ..	A	Light ..	A. T. Facey ..	Thomastown
1241	Bronzewood ..	A	Thoroughbred	Quinlan Bros. ..	Oakland's Junction
1287	Buck	A	Pony ..	Dolman Bros. ..	Coleraine
1212	Calais	A	Light ..	G. Officer ..	Woolsthorpe
1213	Capshot	A	Thoroughbred	J. G. Davidson ..	Casterton
1214	Carolyn	A	Draught ..	J. Withers ..	Mansfield
1222	Carovita	A	Pony ..	J. Clark ..	Cowwarr
1012	Cedric Hero ..	3	Draught ..	A. W. Giddings ..	Sea Lake
1132	Challicum Punch ..	A	,, ..	W. Kelly ..	Beaufort
1225	Champion of Kelmscott	A	,, ..	W. H. Robinson	Kerang
1321	Chenard	4	Light ..	W. T. Carter ..	Coleraine
1305	Chief Justice ..	A	Pony ..	O. W. Fisher ..	Morgan's Bridge
1192	Chieftain	5	Draught ..	H. Gilmour ..	Thornton
1187	Clan Newton ..	5	,, ..	S. J. Lynn ..	Orbost
1218	Claymore	A	Pony ..	J. P. Hanrahan	Ballan
1148	Cleve Todd ..	3	Light ..	T. A. Hardwick	North Essendon
1161	Clyde Boy ..	A	Draught ..	H. Goldsmith ..	Corac
1319	Colonel Garfield ..	A	,, ..	Colyer Bros. ..	Yea
1271	Colonel Young ..	A	,, ..	W. H. Twigg ..	Janiember
1313	Come More ..	A	Pony ..	C. H. West ..	Buchan
1054	Coronation Day ..	A	,, ..	H. W. Atkinson	Gritjurk
1210	Count Traquair ..	A	Thoroughbred	T. D. Ryan ..	Tatura
1329	Coupar's Best ..	2	Draught ..	Baxter Bros. ..	Mooroopna North
1131	Craigieburn Premier	5	,, ..	F. C. Thomas, jun.	Blackheath
1289	Craigie Masterstroke	A	,, ..	Falkiner and Sons	Widgiewa, N.S.W.
1107	Craigwillie of Bolobek	6	,, ..	W. Walter ..	Tatura
1276	Creeper	5	Pony ..	A. Brown ..	Rosedale
1307	Cross-in-Hand Charmer	A	Draught ..	T. E. Coster ..	Sarsfield
1255	Culloden	A	Light ..	A. Millard ..	Yaapeet
1106	Cutty Sark ..	A	Pony ..	L. Dureau ..	Woodford
1244	Cymbrel	3	Light ..	D. Robbins ..	Korumburra
1224	Cymro Bach ..	A	Pony ..	H. S. Rudduck ..	Melbourne
1347	Cymro Ddu ..	A	,, ..	H. C. Lees ..	Lower Bethanga
1114	Dan Bells ..	A	Light ..	H. G. Gregerson	Benalla
1083	Danedite	A	Draught ..	P. Gardiner ..	Carlisle River
1130	Dandy	A	Pony ..	E. Whitehead ..	Mirboo North
1124	Dandy Direct ..	3	Light ..	L. Harper ..	Rutherglen
1194	,, Geordie ..	A	Pony ..	T. G. McKenzie ..	Yarram
1186	Darling's Comet ..	A	Draught ..	Brock Bros. ..	Moe
1249	Desert Child ..	3	Light ..	J. T. Carroll ..	Molka
1240	Detonator ..	A	Pony ..	Quinlan Bros. ..	Oakland's Junction
1211	Dibdale	A	Light ..	G. Officer ..	Woolsthorpe
1309	Digilista	A	,, ..	S. Nathan ..	Yarra Glen

STALLIONS REGISTERED FOR 1921-22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1247	Don Huon ..	A	Pony ..	W. Lyons ..	Drouin
1060	Drummond King ..	A	Draught ..	H. and G. Holland	Piavella
1285	Duke	A	,, ..	E. A. Thornley ..	Hawkesdale
1185	Duncan Stewart ..	4	,, ..	J. Fitzpatrick ..	Heyfield
1055	Edgeworth ..	A	Light ..	P. J. White ..	Janiember E.
1062	Emulator Junior ..	A	Pony ..	J. G. Scott ..	Hopetoun
1235	Estelle Junior ..	2	Light ..	D. Green, jun. ..	Nullawil
1004	Ettrickdale ..	A	Pony ..	J. Donovan ..	Yackandandah
1125	Everard Bute ..	2	Draught ..	J. G. Bail ..	Kyabram
1090	Expectation ..	A	Light ..	S. Cameron ..	Quambatook
1078	Fast Time	A	Pony ..	J. Nevitt ..	Toolamba
1269	Field Ambulance ..	A	Light ..	F. Canning, sen...	Stratford
1126	Fire Bells	2	,, ..	J. McFarlane ..	Yarraville
1282	Fluten	A	Pony ..	E. Johnson ..	Romsey
1074	Flying Possum ..	4	,, ..	H. E. Wood and Sons	Mooroopna
1143	Footwork	3	Light ..	J. Chapman ..	Ouyen
1127	Gallant Lad ..	A	Draught ..	A. A. S. Mitchell	Hopetoun
1184	Garnet	A	Light ..	J. J. Carmody ..	Leongatha
1150	Gay Gordon ..	A	Pony ..	J. R. Mitchell ..	Sandford
1067	Glad Star	4	Draught ..	Melbourne and Metropolitan Board of Works	Werribee
1205	Glengarnock ..	6	,, ..	B. McKenzie ..	Bass
1204	Glengarry ..	A	Pony ..	W. L. Stewart ..	Newbridge
1288	Glenmooney ..	5	Light ..	G. H. Palfrey ..	Campbellfield
1335	Glenorchy ..	A	Draught ..	H. Hance ..	Lang Lang
1316	Glynne	A	Light ..	G. Collis, jun. ..	Alberton
1117	Glynne Loch ..	5	,, ..	R. Costello ..	Darriman
1149	Glyn Trustful ..	A	Pony ..	D. Duggan ..	Yinnar
1190	,, Wilton ..	2	,, ..	J. J. Love ..	Mernda
1152	Godwin	A	Thoroughbred	J. H. Bomford ..	Orbost
1303	Golden King ..	A	Light ..	H. Neary ..	Bowman's Forest East
1168	Goldie	A	,, ..	W. J. Minns ..	Melton South
1100	Gospel Bells ..	A	,, ..	J. G. Christie ..	Healesville
1302	Grattan Bells ..	A	,, ..	T. Shearwood ..	Dooen North
1135	Greylight 2nd ..	5	Pony ..	A. Hordern ..	Bowral, N.S.W.
1128	Griffo	A	,, ..	P. Hourigan ..	South Purrumbete
1191	Gypsy Hero ..	A	Draught ..	A. O'Neill and Son	Nathalia
1245	Hamilton Hero ..	A	,, ..	A. Booley ..	Banyan
1073	,, Emulator, Junior	A	Pony ..	Todd Bros. ..	Willenabrina North
1002	Hamiltonian ..	A	Draught ..	J. G. Scott ..	Hopetoun
1013	Harry Rose ..	A	Light ..	A. G. Hunter ..	Elmore
1239	Hero	A	Draught ..	J. Carruthers ..	Picola W.
1317	Hero Laddie ..	A	,, ..	H. F. Robinson	Kerang
1246	Herward Junior ..	6	Light ..	J. A. Haebich ..	Bittern
1155	High Commissioner..	4	Draught ..	F. Bowden ..	Won Wron
1089	Highland Boy ..	A	,, ..	S. Cameron ..	Quambatook
1327	,, Boy ..	A	Pony ..	G. Thomson ..	Koroit
1330	,, Cleve ..	A	Light ..	M. L. Greatz ..	Irymple
1312	Honourable ..	A	,, ..	R. F. Savige ..	Moe
1014	Humoresque ..	3	Pony ..	A. C. Bayley ..	Willaura
1323	Ian Dhu	A	Light ..	N. C. Gibson ..	Joel South
1301	Imperial Crown ..	A	,, ..	T. G. Maher	Purnim

STALLIONS REGISTERED FOR 1921-22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1181	Jack Smith ..	5	Draught ..	S. Maddern, jun.	Leongatha
1293	Jimmy Lea ..	A	Light ..	W. Bradshaw, sen.	Skipton
1081	J. N. S.	A	,, ..	J. N. Spittle ..	Birchip
1318	Jock McCraw ..	4	Draught ..	Williamson and Coghill	Wendouree
1101	Judge Byron ..	A	Light ..	R. Galway ..	Stratford
1163	Kemp Daly ..	A	,, ..	G. H. Minns ..	Melton
1165	Ki Ki	A	Pony ..	J. T. Laidlaw ..	Chetwynd
1015	King Bellance ..	5	Draught ..	J. H. Kennett ..	Kaniva
1098	,, Osterley A. ..	A	Light ..	G. Anderson ..	Newtown
1016	Kingslea ..	3	,, ..	I. N. Hutcheson	Pullut
1189	King's Treasure ..	6	Thoroughbred	G. Ritchie ..	Delatite
1061	King Wilks ..	A	Light ..	J. Brights ..	Mirboo
1262	Laird Again ..	A	Draught ..	P. Davey ..	Miner's Rest
1202	,, Gowrie ..	A	,, ..	F. Corner ..	Rushworth
1311	Lake King ..	A	Thoroughbred	W. G. Smith ..	Yackandandah
1248	Last Mistake ..	A	Light ..	Stock Bros. ..	Sandford
1322	Leeway	A	,, ..	A. J. McGillivray	Rainbow
1258	Lion	A	Pony ..	G. Brown ..	Merino
1270	Little Jim ..	A	,, ..	W. J. Bowe ..	Maldon
1251	Little Mickey ..	A	,, ..	C. Simon ..	Leongatha
1061	,, Welshman ..	A	,, ..	J. F. Kelly ..	Emu
1310	Llewellyn II. ..	A	,, ..	T. McKendrick ..	Avenel
1281	Lord Aldie ..	5	Draught ..	S. E. Mackieson ..	Buchan
1220	,, Bindi ..	A	,, ..	R. T. Yapp ..	Bindi
1109	,, Everest ..	A	,, ..	A. Colvin ..	Nathalia
1215	,, Lonsdale ..	A	Pony ..	D. G. Tomkins ..	Coleraine
1169	,, Osterley ..	A	Light ..	A. Drennan ..	Walpeup
1009	,, Ronald ..	A	Draught ..	E. Allan ..	Ondit
1017	,, Threave ..	4	,, ..	J. Watkins ..	Euroa
1157	,, Wallace ..	5	,, ..	J. Farrell ..	Briagolong
1229	Loudoun Squire ..	A	Light ..	J. Dunlop ..	Birregurra
1122	Lue Ribbons ..	6	,, ..	L. Williams ..	Ross Creek
1216	Lyndale	A	Draught ..	H. Conn ..	Barrakee
1141	McKinney Star ..	4	Light ..	Noel Bros. ..	Terang
1019	Mac's Fancy II. ..	2	Draught ..	Tucker Bros. ..	Kennysford
1144	Macedon Hero ..	4	,, ..	P. Williams ..	Riddell's Creek
1022	Major Albert ..	3	,, ..	J. P. Doherty ..	Rochester
1020	Major Jock ..	A	,, ..	F. C. Glanville ..	Echuca North
1112	Maltstead ..	4	Light ..	E. J. Wright ..	Gormandale
1332	Marcus	A	,, ..	W. E. J. Craig ..	Melbourne
1292	Master Vengeance ..	A	,, ..	W. Bradshaw, sen.	Skipton
1007	Maurite	5	,, ..	D. E. Kervin ..	Cohuna
1217	Menkawrah ..	A	Thoroughbred	J. L. Vallence ..	Cohuna
1021	Merry Jock ..	3	Draught ..	J. Harrison ..	Derby
1018	Merry Lad ..	2	,, ..	T. Sweeney ..	Boolite
1086	Merry Oliver ..	A	Light ..	E. R. de Little ..	South Caramut
1173	Message	A	,, ..	J. Tack ..	Fairbank
1136	Metal Bells ..	3	,, ..	A. Gillis ..	Newmarket
1283	Michael	A	Pony ..	Mrs. Bell ..	Flynn
1137	Mont Roy ..	3	,, ..	H. Sage ..	Somerville
1171	Mountain Palm ..	A	Light ..	E. J. Lukey ..	Warracknabeal
1195	Moving Star ..	4	,, ..	S. Field ..	Mt. Waverley
1097	Musket Bells ..	A	,, ..	J. H. Latta ..	Derrinallum
1088	Native Prince ..	A	Draught ..	R. McKenzie ..	Woodford
1010	Newton Bold ..	6	,, ..	L. J. King ..	Quambatook
1159	Newton Lad ..	A	,, ..	T. H. Tink ..	Serviceton
1096	Nimrod	A	Pony ..	G. Small, jun. ..	Birchip

STALLIONS REGISTERED FOR 1921–22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1102	Non Pariel ..	3	Draught ..	W. Geddes ..	Boomahnoomoonah
1021	Ochtertyre Sturdy ..	5	,, ..	D. Ervin ..	Pyramid Hill
1263	October	A	Light ..	W. Wilson ..	Cobram
1162	O.K.	A	,, ..	A. G. Roberts ..	East Brunswick
1151	Onward Star ..	A	Draught ..	J. Murchison ..	Dumbalbalane
1070	Osprey Junior ..	A	Light ..	J. Axford ..	Terang
1333	Oster Direct ..	A	,, ..	J. Corry ..	Barmah
1024	Ostrich Lad ..	2	Pony ..	A. Rose ..	Penshurst
1077	Our Bobby ..	A	,, ..	W. H. Gardiner ..	Lurg
1264	O. Y. K.	A	Light ..	G. H. Palfrey ..	Melbourne
1025	Paceaway ..	A	,, ..	T. H. Clyne ..	Echuca
1299	Palos	A	,, ..	R. Warren ..	West Moolap
1297	Perfection ..	A	,, ..	E. A. Baker ..	Gilleston
1026	Peter	A	,, ..	J. Carroll ..	Myrtleford
1221	,, ...	A	Pony ..	J. Abrahams ..	Fitzroy
1342	Polo King ..	A	,, ..	W. H. J. Baker ..	Portland
1286	Pompy	5	,, ..	E. H. B. Cleland ..	Cowes
1087	Predominate ..	A	Light ..	E. R. de Little ..	South Caramut
1104	Prince Alexander 2nd	A	Draught ..	D. and J. McNabb ..	Morwell
1115	Prince Baron ..	2	,, ..	G. Crabbe ..	Yeo, Colac
1233	,, Binnia ..	A	Light ..	C. Nolte ..	Merino
1005	,, Bronte ..	4	Pony ..	E. Davey ..	Charlton
1180	,, Clifton ..	3	Draught ..	Exors. late D. Mitchell ..	Lilydale
1324	,, Denver ..	A	Light ..	H. Bambridge ..	Northcote
1174	,, Rhymney ..	5	Pony ..	E. Kennedy ..	Bass
1341	,, William ..	A	Draught ..	W. R. Berger ..	Devenish
1105	Principal	A	Light ..	J. Kosch ..	Byaduk
1198	Quality	4	Pony ..	A. E. Callow ..	Ballarat
1232	Quatta's Belmont ..	5	Draught ..	M. Lindsay ..	Baranduda
1291	Radium	5	Light ..	Manifold and Co.	Purrumbete
1027	Real Scotch ..	4	Draught ..	J. Rumbold ..	Maldon
1193	Red King	A	Light ..	W. Holland ..	Benambra
1197	,, Lion	6	Thoroughbred	G. Tantram ..	East St. Kilda
1028	,, Lion	4	Pony ..	G. H. Whitehead ..	Minhamite
1057	,, Wilkes ..	A	Light ..	E. Rash ..	Ballarat
1094	Richard Cleve ..	A	,, ..	G. E. Hodgins ..	Hastings
1103	Richard III. ..	A	Pony ..	A. Ruttle ..	Inverloch
1170	Ringmaster ..	A	Draught ..	A. Drennan ..	Walpeup
1063	River Bells ..	A	Light ..	J. Byrne ..	Toora North
1238	Roala	2	Pony ..	B. E. Lyon ..	Coleraine
1325	Ronya's Bells ..	4	,, ..	W. M. Saynor ..	Hawthorn
1029	Royal Bill.. ..	3	Draught ..	V. Wyatt ..	Rainbow
1145	Royal Bute ..	3	,, ..	W. M. Black ..	Coldstream
1030	,, Craig ..	3	,, ..	D. Trewick ..	Elmore
1346	,, Flush ..	A	,, ..	J. Rochford ..	Byaduk
1031	,, Hero ..	3	,, ..	James Bros. ..	Merrigum
1032	,, Marksman ..	2	,, ..	W. Dahlenburg ..	Salisbury
1069	,, Robin ..	A	,, ..	A. Pyers ..	Charlton
1250	,, Standard ..	A	,, ..	J. Christie, jun...	Katunga
1298	Rysharold.. ..	A	Pony ..	A. H. Hunt ..	Lancefield
1033	Safe Voyage ..	5	Light ..	V. Meyers ..	Lockwood
1147	Sailor King ..	3	,, ..	J. Round ..	Buckrabanyule
1237	Sandy's Fashion ..	2	Draught ..	E. Haines ..	Gerung
1182	Scotch Thistle ..	3	,, ..	J. Power ..	Strathallan
1345	Scottie	A	Pony ..	L. McDonald ..	Hamilton

STALLIONS REGISTERED FOR 1921–22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs			
1154	Seldom Seen ..	2	Draught ..	W. Dugdale ..	Bacchus Marsh
1085	Selkirk	A	Light ..	A. Scott ..	Elmore
1034	Senator	5	Draught ..	Wittenow Bros. ..	Murmungee
1253	Several	A	Thoroughbred	N. Boyd ..	Franklinford
1277	Shandon Bells ..	A	Light ..	A. Missen ..	Truganina
1058	Shifty Dick ..	A	,, ..	J. Foster ..	Casterton
1257	Silver Abbey ..	3	,, ..	A. C. McLennan	Clunes
1179	Sir Bute	4	Draught ..	Clyne Bros. ..	Tinamba
1008	,, Clyde	5	,, ..	S. J. Taylor ..	Lake Boag
1075	,, Everest ..	4	,, ..	A. Ralston ..	Lucknow
1175	,, George ..	5	,, ..	E. J. Griffiths ..	Tongala
1273	,, George.. ..	5	Pony ..	I. K. Russell ..	Hesse
1178	,, Harold ..	5	,, ..	Mrs. N. Rose ..	Epping
1280	,, Northcote ..	2	Draught ..	G. Madden ..	Batesford
1183	,, Richard 2nd ..	A	Pony ..	W. Henderson ..	Grasmere
1035	,, Robert Newton	4	Draught ..	P. Lawrie, jun. ..	Rushworth
1110	,, Whyee ..	A	Light. ..	W. E. Johnstone	Woodford
1304	,, William Wallace	A	Draught ..	O. W. Fisher ..	Morgan's Bridge
1095	Solomon IV. ..	A	,, ..	C. H. Perkins ..	Rainbow
1036	Some'Style ..	5	Light ..	F. Armstrong ..	Campbell's Creek
1037	Southern Lad ..	4	Draught ..	G. McKenzie ..	Pullut
1038	Speculation ..	4	Light ..	Bourke and Quinn	Rochester
1039	Squib	5	Pony ..	A. Robertson ..	Willaura
1040	St. Aidan	4	Light ..	M. Cribbes ..	Faraday
1041	Standard	5	Draught ..	J. G. Scott ..	Hopetoun
1308	Standish Direct ..	A	Light ..	T. Kelly ..	Barraport
1337	Stirling Castle ..	A	Draught ..	V. M. Henry ..	Cowes
1042	Stockman's Lad ..	3	,, ..	J. F. Schulz ..	Lake Hindmarsh
1177	Sugar King ..	3	Thoroughbred	D. J. Weekes ..	Stratford
1158	Sunny Simon ..	3	Light ..	A. McDonald ..	Nagambie
1156	Swimming Belt ..	A	,, ..	W. T. Cox ..	Moolort
1123	Taffy	A	Pony ..	T. J. Morrissey ..	Becac
1120	,, ...	6	,, ..	J. Sargent ..	Yanac
1119	Take Bells ..	A	Light ..	W. Kelly ..	Redesdale
1044	Tamie O'Groat ..	3	Draught ..	A. L. Pitts ..	Merrigum
1043	Tam O'Shanter Bill..	A	Pony ..	P. Gordon ..	Ellerslie
1348	Territorial ..	A	Draught ..	R. M. Thomas ..	Devon North
1045	The Hague ..	A	Thoroughbred	S. Winter-Cooke..	Hamilton
1223	The Joker ..	A	Pony ..	A. E. Ellery ..	Redesdale
1172	The Nipper ..	A	,, ..	T. H. Bush ..	Pennyroyal
1320	The Premier ..	A	Draught ..	J. Roberts ..	Kumat
1328	The Trick ..	A	Light ..	W. Mellington, jun.	Beulah West
1206	The Vanquisher ..	A	Thoroughbred	G. W. Horne ..	Lal Lal
1334	This Time ..	A	Pony ..	H. Hance ..	Lang Lang
1207	Thunder Jewel ..	A	Thoroughbred	T. Daffy ..	Swan Marsh
1111	Tinytown ..	5	Pony ..	J. Deane ..	South Yarra
1284	Tom Pepper ..	A	,, ..	E. A. Thornley ..	Hawkesdale
1140	Tony Bells ..	A	Light ..	R. K. McLennan	Marnoo
1153	Towyvale Flyer ..	A	Pony ..	W. J. Cadman ..	Thougla
1076	Tra George ..	A	Thoroughbred	W. E. Hayes ..	Leongatha
1208	Trilight	A	Light ..	R. P. Nicol ..	Yarram
1071	True Blue ..	2	Draught ..	C. S. Maddern ..	Kaniva
1203	Truro	A	Light ..	M. J. O'Brien ..	Hamilton
1011	Udale	A	Draught ..	A. Gillis ..	Newmarket
1046	Unit	3	Pony ..	B. Rogers ..	Mepunga East

STALLIONS REGISTERED FOR 1921–22—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
1295	Valice Direct ..	5	Light ..	J. Pretty ..	Glenhuntly
1047	Val Royal ..	3	Draught ..	J. C. Wallis, sen.	Miram
1340	Valve	A	Pony ..	W. C. Younger ..	Hansonville
1146	Vice Royal ..	2	Draught ..	W. Black ..	Coldstream
1326	Venture	A	Pony ..	L. E. King ..	Violet Town
1209	Volunteer ..	A	,, ..	T. B. Waters ..	Corryong
1338	Wakepan	A	Light ..	A. W. Johnson ..	Whoroughly
1138	Waratah	4	Pony ..	A. R. Dalton ..	East St. Kilda
1166	Wee McGregor ..	4	,, ..	J. T. Laidlaw ..	Chetwynd
1230	Welsh Flyer IV. ..	A	,, ..	J. Williams ..	Nalinga
1049	White Star ..	4	Light ..	G. Kelly ..	Powlett Plains
1048	Widgiewa Sapper ..	4	Draught ..	F. J. Schultz ..	Cowangie
1226	Wigtonshire ..	A	,, ..	Burton Bros. ..	Dennison
1068	Wonder	6	Pony ..	W. McEvoy ..	Alexandra
1314	Yarraview Mark ..	2	Draught ..	A. E. T. Payne ..	Lilydale
1315	Young Albyn ..	A	,, ..	J. Watkins ..	Euroa
1139	Young Caesar ..	3	Pony ..	A. E. Hoadley ..	Melbourne
1050	,, Dan ..	3	Draught ..	J. C. R. Tonkin ..	Mt. Jeffcott
1306	,, Hamilton Hero	3	,, ..	Bateson Bros. ..	Cowangie
1084	,, Lord Lyon ..	A	,, ..	G. R. Main ..	Malmsbury
1196	,, Lymm Champion	2	,, ..	W. H. Penaluna	Boolarra
1234	,, Major ..	5	,, ..	C. Gould ..	Tatyoon
1176	,, Portable ..	3	Light ..	E. Waller ..	Orbost
1294	,, Prince ..	A	Draught ..	W. Splatt ..	Inverleigh
1121	,, Prince Royal	A	,, ..	W. D. Gibb ..	Moyhu
1108	,, Recruit ..	A	Pony ..	E. W. Waters ..	Echuca East
1051	,, Royal Oak ..	A	Draught ..	G. Reid ..	Merbein
1219	,, Rysharold ..	A	Pony ..	W. Brown ..	Fitzroy

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

If the work has not already been done, the orchard should be kept in constant cultivation so as to conserve the abundant spring rains. Should the summer become hot and dry, this will be a very necessary precaution. Even where the soil had been previously well cultivated, the cultivators should again be run over the surface, as any hot weather will cause the soil to crust, which would be the means of dissipating a very considerable amount of soil water. Every effort should be taken to retain this moisture so that the fruit crops shall have all they require for their perfection. To further attain this end no weeds should be allowed to grow in orchard soils

BUDDING.

Young trees, or old trees that have been previously cut down in preparation for budding, may be worked towards the end of the month. It is advisable to select dull, cool weather for this operation, so that the sap may run more freely, and that atmospheric conditions may not have too drying an effect on the bud. The operation of budding is a very simple one, and is easily performed. To gain a successful end, the sap should be flowing freely, so that when the cuts are made the bark should "lift" or "run" easily, and without any clinging or tearing of the fibres, and it should separate freely from the wood. The bud selected should be firm and well matured, and should show no signs of premature growth whatever. It should be cut from the scion with a shallow cut, and if any wood be left in the cutting it should be taken out of the bud. A smooth, clean spot should be selected on the bark of the stock, and a T-shaped cut made, the vertical cut being longer than the horizontal one. The bark at the point where the cuts meet should be raised, and the bud inserted between the bark and the wood of the stock. The bud should be gently pressed down into position, and then bound with soft twine, string, or raffia. If the bud be too long for the cut, the top may be cut off level by means of a horizontal cut. With practice it will soon become possible to take the buds so that they will need neither cutting nor trimming.

After two or three weeks the buds should be examined to see if they have "taken"—that is, if the bud has united thoroughly to the stock. When this occurs, the tie may be cut. If a growth be desired at once all wood above the bud may be cut off some short distance above the bud, so as to prevent any bark splitting, and consequent loss of the bud, and so as to throw the bud cut at a fair angle. Ultimately this should be properly trimmed.

If desired, the bud may be left dormant throughout the autumn and winter till spring. In this case the branch should not be cut off, but left on till the usual winter pruning.

SUMMER PRUNING.

The profuse spring and summer rains have caused a vigorous growth in the fruit trees. In order to more economically utilize this abundant growth, it should be now summer pruned, particularly on the apple and pear trees. Care should be observed that as much of the leafage as possible is retained on the tree. Unduly long laterals of fruiting trees may be shortened back, always cutting to a leaf. Unnecessary terminal leader growths, of which there are sometimes three or four, all strong growing, may be reduced to one, retaining this one as a leader. In no case should this growth be cut or interfered with in any way.

The results of these cuts will be to divert the sap which was flowing into growths that would subsequently be pruned, into more profitable channels, so that weak buds and growths may be strengthened, and induced into fruit bearing.

The Vegetable Garden.

The work in this section is much the same as in the flower garden. Good mulching and regular soil stirring will be the work for the month. As soon as any bed is cleared of vegetables it should be manured and

well dug over in preparation for the next crop. Deep digging is always desirable in vegetable growing. If any pest, such as aphis, or caterpillars, or tomato weevil, have been present, it would be advisable to burn all the crop refuse, or to destroy any insects that remain, and to give the plot a dressing of gypsum, or of Clift's manurial insecticide.

Keep the tomatoes well watered and manured, pinching out surplus and strong grown laterals. In early districts the onion crop will be ripening. In late districts, or with late crops, the ripening may be hastened by breaking down the top. An autumn crop of potatoes may be planted. Cabbage, cauliflower, lettuce, and celery plants may be planted out. Keep asparagus beds well watered.

The Flower Garden.

January should be a busy month in the garden. It may be necessary to water frequently, and after every watering the surface should be well loosened, and stirred with the hoe to keep it moist and cool. More cultivation and less water is a good rule to be observed. The hoe should be used more, and the hose less, in summer; greater benefits will accrue, and the water bill will be considerably reduced. Mulchings with straw, grass, &c., are very useful just now. The mowings from lawns form valuable mulching. Waste tobacco stems are also valuable as a mulch.

Dahlias, chrysanthemums, and other tall-growing, slender herbaceous plants will require support in the way of stakes. They will also need mulching considerably. These plants should receive no check whatever, and should be continued with a regular even growth right through the season. Another desideratum is that soils should be well drained, as plants of all descriptions thrive better in well-drained soils.

A sharp look-out should be kept on these plants for attacks of red spider. If this insect appears, a good spraying of tobacco solution or benzole emulsion should be given.

Constant watch will need to be kept for the various small caterpillars that attack the buds of these plants. Spraying with a weak solution of paris green and lime, or similar insecticide, will be useful. Hand-picking should also be resorted to.

REMINDERS FOR FEBRUARY.

LIVE STOCK.

HORSES: *At grass.*—Supplement dry grass, if possible, with some greenstuff. Provide plenty of pure water and shade shelter. *In stable.*—Supplement hard feed with some greenstuff, carrots, or the like, and give a bran mash once a week at least. Avoid over-stimulating foods, such as maize and barley. Give hard feed in quantities only consistent with work to be performed. Stable should be well ventilated, and kept clean. When at work, give water at short intervals. Always water before feeding. Great benefit will result in supplying horses—more especially young ones running at grass—with a lick. The following one is recommended:—

Salt	20 parts
Lime	20 parts
Superphosphate	10 parts
Sulphate of iron	5 parts.

By having troughs constructed that will protect the lick from rain a considerable saving will be made.

Horses at grass require their feet attended to at frequent intervals, otherwise deformity of feet and lameness may result.

CATTLE.—Provide succulent feed and plenty of clean water easy of access; also shade and salt lick in trough. Have each cow's milk weighed and tested for butter fat regularly. Rear heifer calves from those that show profitable results. Give milk at blood heat to calves. Keep utensils clean or diarrhœa will result. Do not give too much at a meal for the same reason. Give half-a-cup of limewater per calf per day in the milk. Let them have a good grass run or lucerne, or half-a-pound of crushed oats in a trough. Dehorn all dairy calves except those required for stud or show purposes. Keep bulls away from cows.

PIGS.—Sows about to farrow should be supplied with short bedding in well-ventilated styes. All pigs should be provided with shade and water to wallow in. There will be plenty of cheap feed available now, and there is a good margin between cost of feed and price for fat pigs. Read *Bulletin* No. 16.

SHEEP.—In the case of very strong cross ewes, rams should not be removed until well on in this month, for this class, together with most pure ewes of British blood, are only now coming in season. To breed out this late lambing tendency, and to procure quality and quantity of wool as well as a good carcass, use carefully-bred, level-made merino rams. If the right type be not procurable at reasonable rates, use good Corriedales or Comebacks. Should there be among the rams any distinctly inferior to the others, keep them back for three weeks. Remember, narrow inferior rams are invariably the most active workers compared with sheep of more substance.

CULTIVATION.

FARM.—See that haystacks are weatherproof. Cultivate stubble and fallow, and prepare land for winter fodder crops. Get tobacco sheds ready for crop. In districts where February rains are good, sow rye, barley, vetches, and oats for early winter feed.

ORCHARD.—Spray for codlin moth. Search out and destroy all larvæ. Cultivate the surface where necessary and irrigate where necessary, paying particular attention to young trees. Fumigate evergreen trees for scale. Continue budding.

FLOWER GARDEN.—Cultivate the surface and water thoroughly during hot weather. Summer-prune roses by thinning out the weak wood and cutting back lightly the strong shoots. Thin out and disbud dahlias and chrysanthemums. Layer carnations. Plant a few bulbs for early blooms. Sow seeds of perennial and hardy annual plants.

VEGETABLE GARDEN.—Continue to plant out seedlings from the seed-beds. Sow seeds of cabbage, lettuce, cauliflower, peas, turnips, and French beans. Keep all vacant plots well dug.

VINEYARD.—February is the best month for the "yema," or summer bud graft (see *Bulletin* No. 35, available on application). Select and mark the best-bearing vines of varieties from which scions will be required for next spring's grafting.

Given suitable climatic conditions, downy mildew will make its appearance. If vines were not sprayed in January they should be sprayed this month. The final spray (January or February) is most important for the protection of the foliage, thus insuring the ripening of the fruit and well-nourished wood, without which a good crop cannot be expected next year. Sulphur again if oidium is prevalent, but avoid sulphuring wine grapes too short a time before gathering. The sulphur may be mixed with Bordeaux mixture, thus enabling the two diseases, oidium and downy mildew, to be combated simultaneously.

Cellars.—Prepare all plant and casks for the coming vintage. An ounce of bisulphite of potash, or a couple of fluid ounces of bisulphite of soda solution, to each bucket of water used to swell press platforms, tubs, &c., will help to keep it sweet. Keep cellars as cool as possible. Complete all manipulations so as to avoid handling older wines during vintage.

In the case of very hot weather occurring during vintage, attention is directed to the new wine-making method by "Preliminary Maceration," described in this issue.

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"EARLIEST OF ALL"

A white-skinned, white-flowered variety of the Kidney type. A heavy cropper of fine quality, and the **quickest tubering** variety at present in the Commonwealth. Eminently suitable for private and market gardens as well as for early and late districts. Being such a rapid grower, its popularity in this climate is assured on account of its being so much less liable to second growth (which is due to extremes of wetness and dryness during the growing period) than any variety at present in cultivation.

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1 to 7 lbs.	1/- lb.	15 to 27 lbs.	10d. lb.
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DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

The Department will shortly have completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter ***fat*** yielded.

(For Record of Yields of dams see Red Poll Herd Book.)

The Bulls in Use include—

LONGFORD MAJOR (Imported)

Dam's Record 14713 lbs. milk ... 6 years average 11338 lbs. milk
G. Dam's ,, 10548 ,, ... 4 ,, ,, 9155 ,,

BELLIGERENT (Imported)

Dam's Record (1st milking) 7144 lbs. milk.

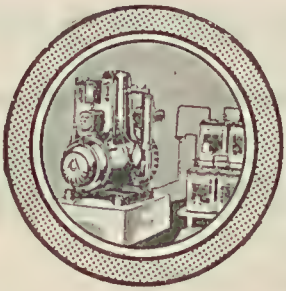
Dam's Dam's	,,	14533 lbs. milk	...	4 years	average	12871 lbs. milk
Sire's Dam's	,,	10370 ,,	...	7 ,,	,,	9354 ,,
Sire's D. Dam's	,,	9510 ,,	...	12 ,,	,,	8033 ,,
G. Sire's D. Dam's	,,	10215 ,,	...	7 ,,	,,	9386 ,,
G.G. Sire's D. Dam's	,,	12565 ,,	...	10 ,,	,,	8853 ,,
G.G.G. Sire's D. Dam's	,,	10088 ,,	...	2 ,,	,,	9754 ,,

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

Application for purchase to

Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.



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This wonderful portable two-cow milker is easily the best on the market. One man can milk a herd of 20 in 45 minutes. It is absolutely portable, and it is the one milker that has the compressed air squeeze; this gives rapid and easy milking, and the cows like it and give more milk.

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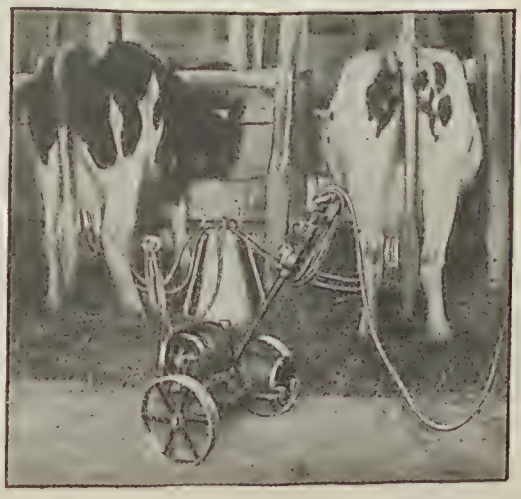

Illustration of the Sharples Moto-Milker in action.

☞ Note the portability and ease of operation

DEPARTMENT OF AGRICULTURE, VICTORIA

Pure Ayrshire Bulls

for Sale

STATE FARM, RUTHERGLEN

Royal Prince of Gowrie Park

Colour, Brown and White. *Calved 30th July, 1915*

Bred by Mr. W. P. Brisbane, Gowrie Park, Weerite, Victoria.

Pedigree.

Sire: Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Princess of Gowrie Park (1710) by Heather of Jock 2nd (387)
2nd Dam: Princess 4th of Luminous of Oakbank (456)
3rd Dam: Young Princess by Dahlia's Adonis (172)
4th Dam: Princess by Young Norman (225)
5th Dam: Fancy by Earl of Seafield (422)
6th Dam: Princess by Norval.

Princess of Gowrie Park yielded 8,930¾ lbs. milk with a 4·67 test in 273 days

COLLEGE PRINCE

Colour, Brown and White. *Calved 24th September, 1917*

Bred by Department of Agriculture at the State Farm, Rutherglen.

Sire: Royal Prince of Gowrie Park by Wallace of Gowrie Park (675) A.H.B. of A.
Dam: Irene 2nd of Flinders by Glen Elgin's Combine.
2nd Dam: Irene of Flinders by Gleneira's Monsieur (546)
3rd Dam: Irene of Gleneira (1727) by Majestic of Oakbank (326)
4th Dam: Isabel of Gleneira (1036) by Red Chief (359)
5th Dam: Gaiety (1006) by Dainty Davie.
6th Dam: Princess (270) by Prince.

Irene 2nd of Flinders yielded 570 gallons of milk with a 4·2 test in 304 days.

Inspection of these Bulls at the State Farm, Rutherglen, is invited

Application for purchase to

Dr. S. S. CAMERON, Director of Agriculture, Melbourne

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Give your Fowls

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It keeps them laying freely—without forcing

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KARSWOOD has been well tried and tested in Australia in all seasons. Sheaves of testimonials from enthusiastic poultry-keepers show definitely that KARSWOOD is a wonderful egg producer. In addition it keeps the birds active and vigorous, and actually halves the moulting period. Read the following statements by enthusiastic KARSWOOD users.

Mr. EVENDEN SAYS HE WILL NEVER BE WITHOUT KARSWOOD.

FISH CREEK,
STH. GIPPSLAND,
12/8/21.

Dear Sirs,

I have been using "KARSWOOD POULTRY SPICE" for one month, and I now desire to state that I will never be without it. Its effects on my 12 Black Orpington Pullets are truly remarkable. Every day, from a week after I started them with "Karswood," I get from the 12 pullets either 10 or 11 eggs. Yesterday not one missed—we got 12 eggs. Before I started with "Karswood" I had a flock of 50 B.O. Pullets. I sold 38 of these, which left me 12. I may state the 12 birds I have were picked out at random, as none of us are poultry experts. The owners of the 38 birds purchased from me have not used "Karswood." They have been getting an average of six eggs per day from them, putting this down to the severe weather we have had down in Gippsland lately. This only seems to emphasize the splendid effect of "Karswood" on my 12 Pullets that have laid so remarkably well in this severe weather. The manufacturers of "Karswood" Poultry Spice, I feel sure, are certainly entitled to claim that "Karswood" puts Profit in Poultry. I do not consider I am wasting my time in writing you this, as I have had long experience with poultry, but never—how much I tried—have I had results like this; therefore, my pleasure in writing.

Very faithfully yours,
(Sgd.) CHARLES C. EVENDEN.

SEND MORE KARSWOOD.

INGLEBURN, N.S.W.,
8th September, 1921.

Dear Sirs,

I will be much obliged if you will forward another 4 tins (7 lb. each) of Karswood Poultry Spice; also enough Chicken Powders for 400 chickens for a month.

Am very glad that the C.F.S. secured this excellent line.

Yours faithfully,
(Sgd.) C. S. COLLARD.

Karswood Poultry Spice (containing ground insects) is invaluable as an egg producer. IT DOES NOT FORCE THE BIRDS, and, therefore, has no injurious effects, as with Cayenne Pepper and other condiments. Karswood Poultry Spice is guaranteed to contain no Cayenne Pepper, Ginger, Gentian, Capsicum, Chillies, or other injurious ingredients. It stimulates egg production by a natural development of the egg-cluster, and the eggs resulting from its use are larger, richer in flavour, and much more fertile.

NOTE THE ECONOMY.

4d. packet supplies 12 hens one week.
1/- packet supplies 20 hens 16 days.
2/- packet supplies 20 hens 32 days.
7-lb. tin (14/-) supplies 140 hens 32 days.
Halfpenny a day to make 12 lay.

One tablespoonful (½ oz.) of Karswood Poultry Spice is sufficient for 20 hens for one day; so that it costs you less than ½d. per day for every dozen fowls.

TRY A 1/- PACKET.

Ask your Poultry Food Dealer to supply you with a 1/- packet of Karswood Poultry Spice, and try it for a fortnight on half-a-dozen hens. Results are not instantaneous—it takes a fortnight or three weeks to improve the egg returns. If your local dealer cannot supply, send a postcard to the Australian Agents (addresses below), asking the name of the nearest dealer who supplies Karswood Poultry Spice.

AUSTRALIAN AGENTS.

New South Wales: Coastal Farmers' Co-op. Society, Ltd., Quay Street, Sydney.

Queensland: Farmers' Co-operative Distributing Co., Turbott Street, Brisbane.

Victoria and Tasmania: Henry Berry and Co., Pty. Ltd., Collins Street, Melbourne.

South Australia: South Australian Milling and Trading Co. Ltd., Baker St., Port Adelaide.

West Australia: Westralian Farmers Ltd., Wellington Street, Perth.

If supplied direct by Wholesale Agents, postage or freight is charged extra.

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VICTORIA

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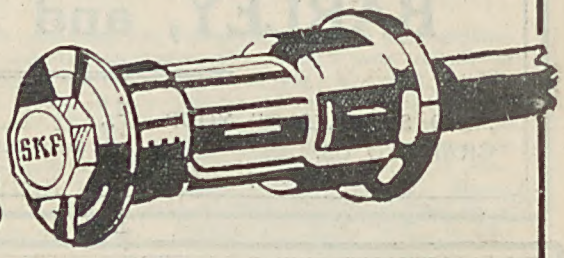

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